

CODE UPDATE

2006 IRC

2005 NEC

U.S.B.C.

Article 110.26(C)(2)

Entrance to Working Space

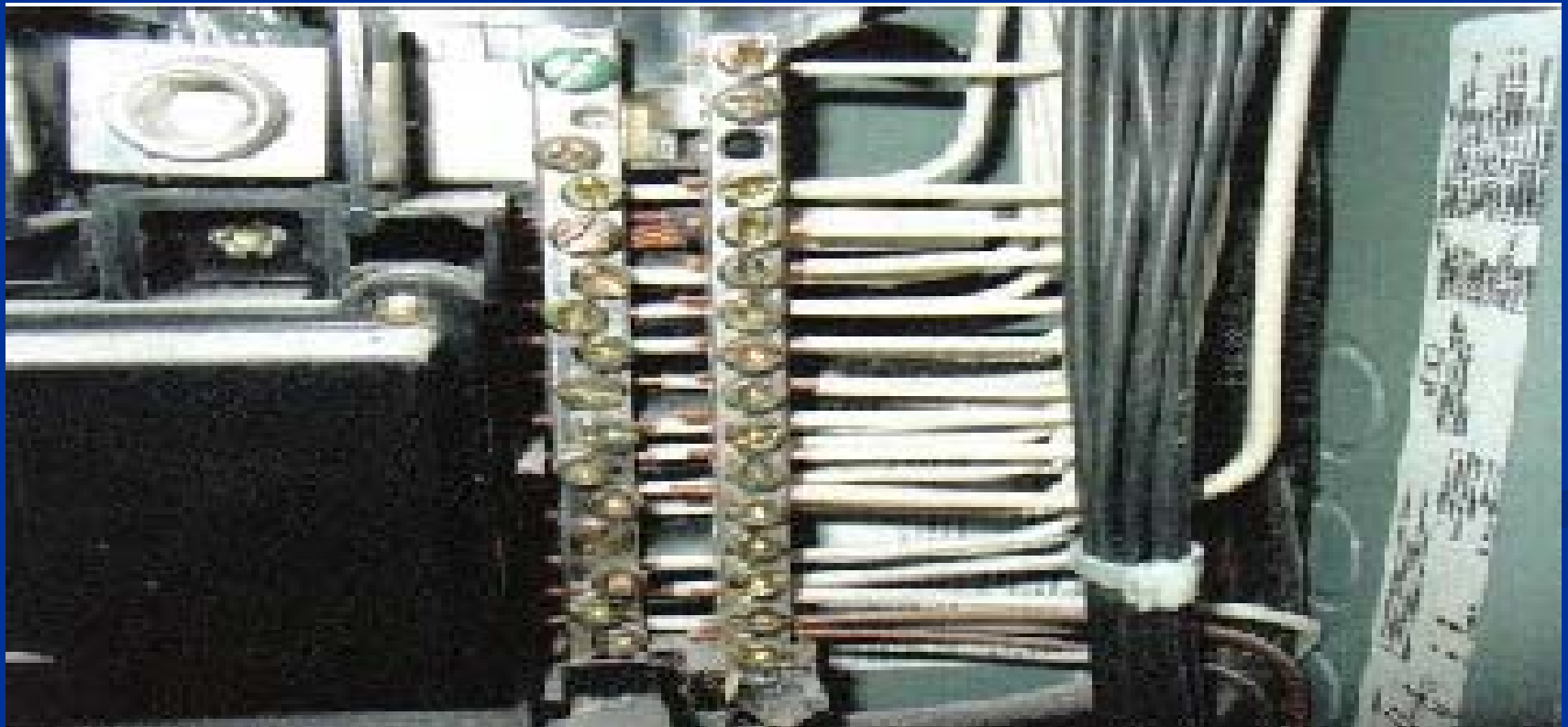
Large Equipment: For equipment rated 1200 amps or more. Deleted wording “and over 6 ft. wide”.



Article 200.6 (D)

Grounded Conductors of Different Systems

Identified and Labeled : Color “Gray” added
and required to be identified at panels.



Article 200.6(D) Cont.

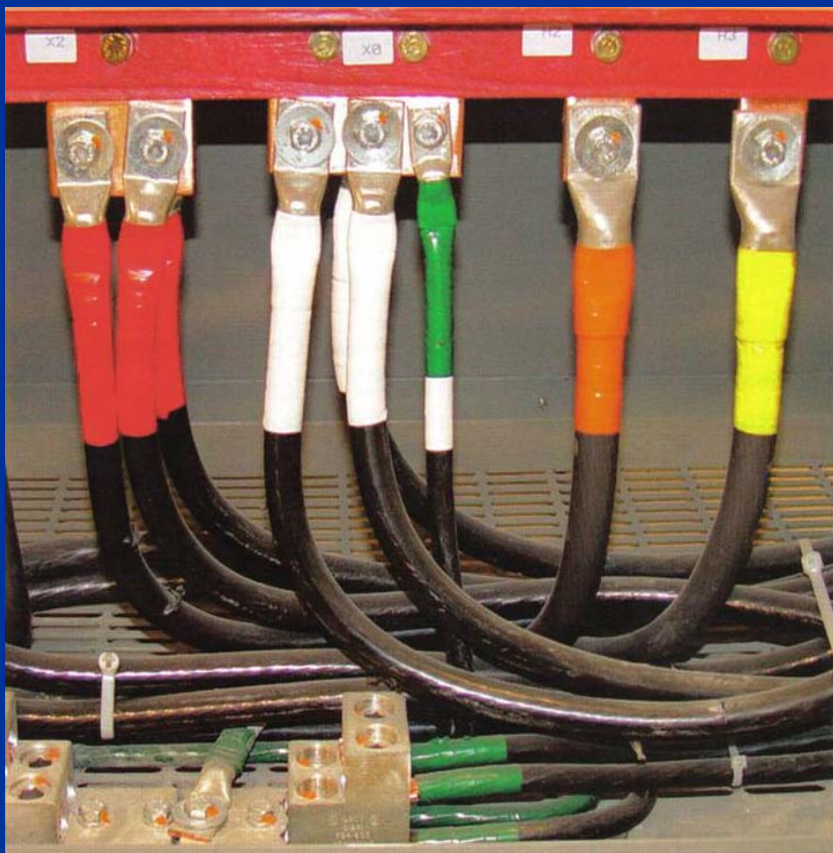
Reorganized:

- Added gray as an approved grounded conductor label. Other and different means will distinguish each system grounded conductor.
- The means of identification shall be permanently posted at each branch circuit panelboard.

Article 210.5 (C)

Ungrounded Conductors

Identified and Labeled: Buildings with Multiple voltage systems shall be labeled at each panel.



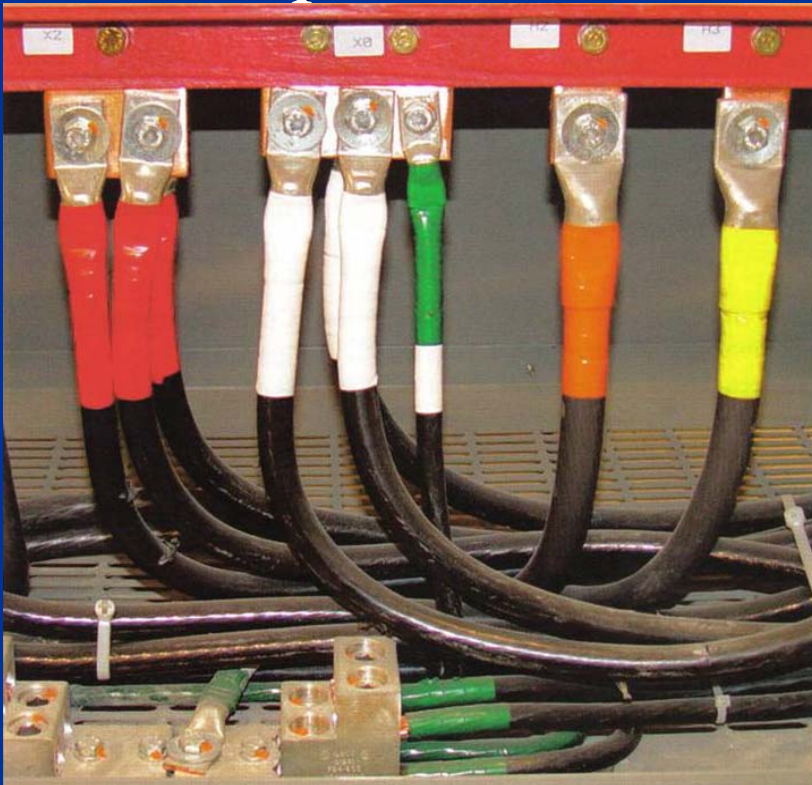
210.5(C) Cont.

- Replaces deleted 210.4(D)
- Method of identification remains the same.
Color coding , marking tape, tagging or other approved means.
- Identification of two wire circuits as well as multi-wire circuits.
- Permanent posting at each branch circuit panelboard.

Article 215.12

Feeders

Identification for Feeders: Buildings with multiple voltage systems shall be labeled at all feeder panelboards.



Article 210.8 (A)(7)/ E3802.7

Laundry, Utility & Wet Bar Sinks

G.F.C.I. Protection: All Receptacles within 6 Ft. of sinks.



Hot Topic

- Washing machine receptacles located six feet or closer to a sink will required GFCI protection.

Article 210.8(B)(2)

Commercial and Institutional Kitchens



210.8(B)(2)

Definition

A kitchen is an area with a sink and permanent facilities for food preparation and cooking.

- ❑ All 125 volt single phase 15 and 20 ampere receptacles in commercial and institutional kitchens shall have GFCI protection.

Article 210.8 (B) (4)

Outdoors in Public Places

G.F.C.I. Protection: Now required for receptacles and equipment accessible to the public.



Article 210.8 (B) (5)

Outdoors

G.F.C.I. Protection: Receptacles at HVAC units.



Article 210.8(B)(5) (Continued)

- Changed to include other than dwelling units.

Hot Topic

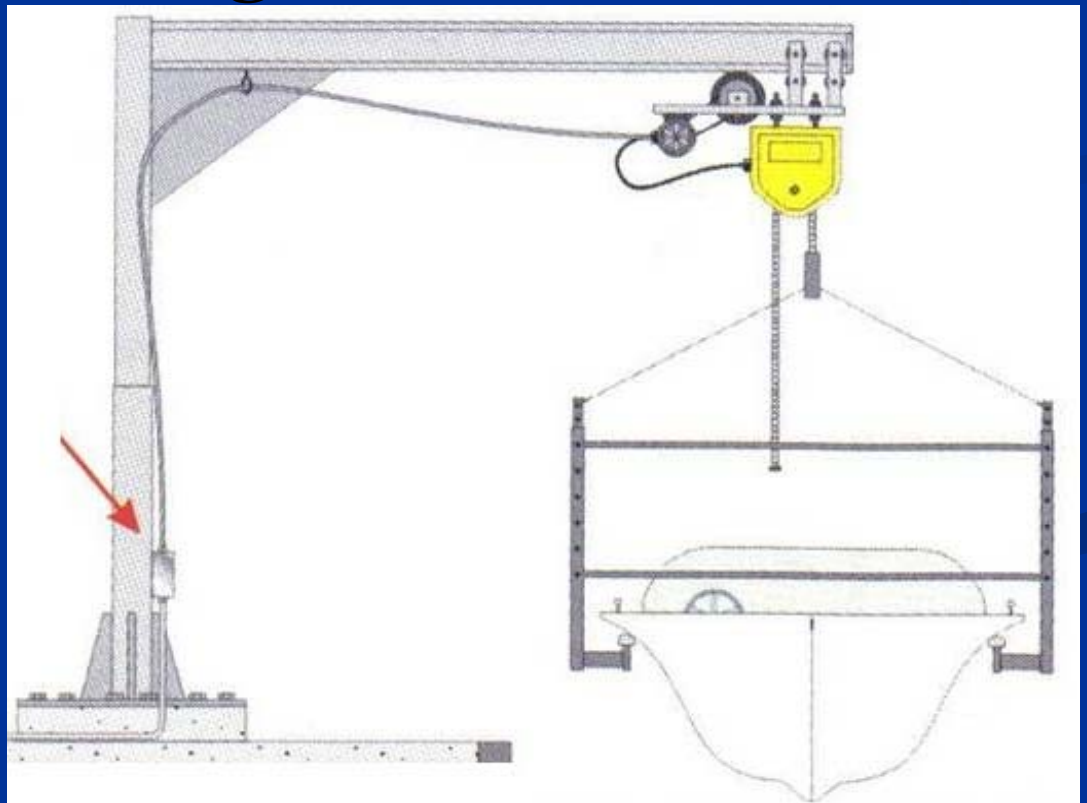
- Maintain proper clearances around disconnects for outside HVAC units.

Article 210.8 (C)/ E3802.9

Boat Hoists

G.F.C.I. Protection required for all 125 volt 15 and 20 ampere outlets and hardwired boat hoists serving dwelling units.

G.F.C.I.
Device





Note:

- Boat hoists in commercial applications are covered in Article 555.



Article 210.12 (B)/ E3802.12

A.F.C.I.'s Dwelling Units

Series & Parallel Rated:

All devices installed
after Jan. 1st 2008 shall
be listed for both.

A.F.C.I. breakers-



AFCI located at other than the origin of the branch circuit .

- Must be installed within 6' of the branch circuit overcurrent device measured along the branch circuit conductors.
- The circuit conductors between the branch circuit overcurrent device and the AFCI shall be installed in a metal raceway or a cable with a metallic sheath.

Article 210.18

Guest Rooms & Guest Suites

Permanent Cooking Equipment: Must comply with Article 210 for dwelling unit requirements.



Note:

- The new 210.18 provides a clear distinction between hotel/motel units with a portable microwave and small refrigerator and those with permanent provisions for cooking.

Must Meet Rules for Dwelling Units



Does Not Have To Comply With The Rules For Dwelling Units

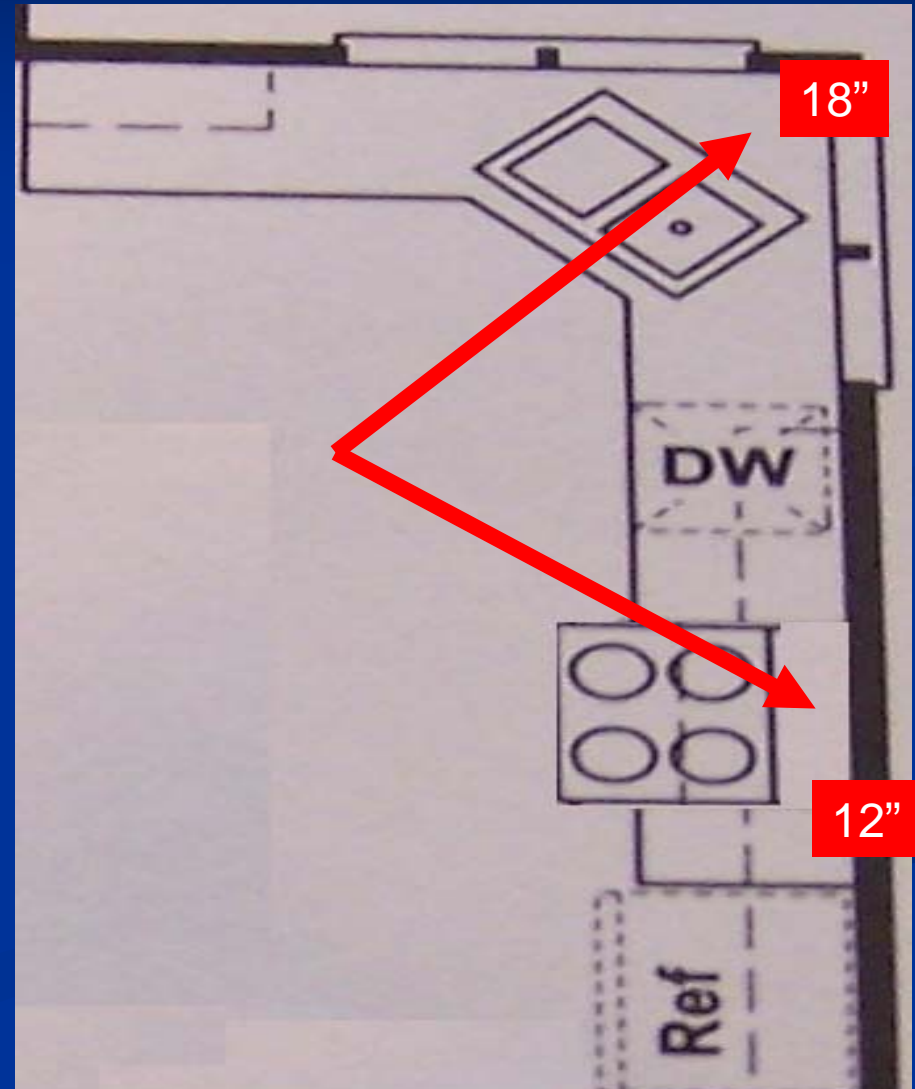


Article 210.52 (C)/ E3801.4.1

Counter Tops

Spaces Behind Sinks & Ranges:

Receptacles required, but they do not count as the required receptacles to serve other countertop spaces.



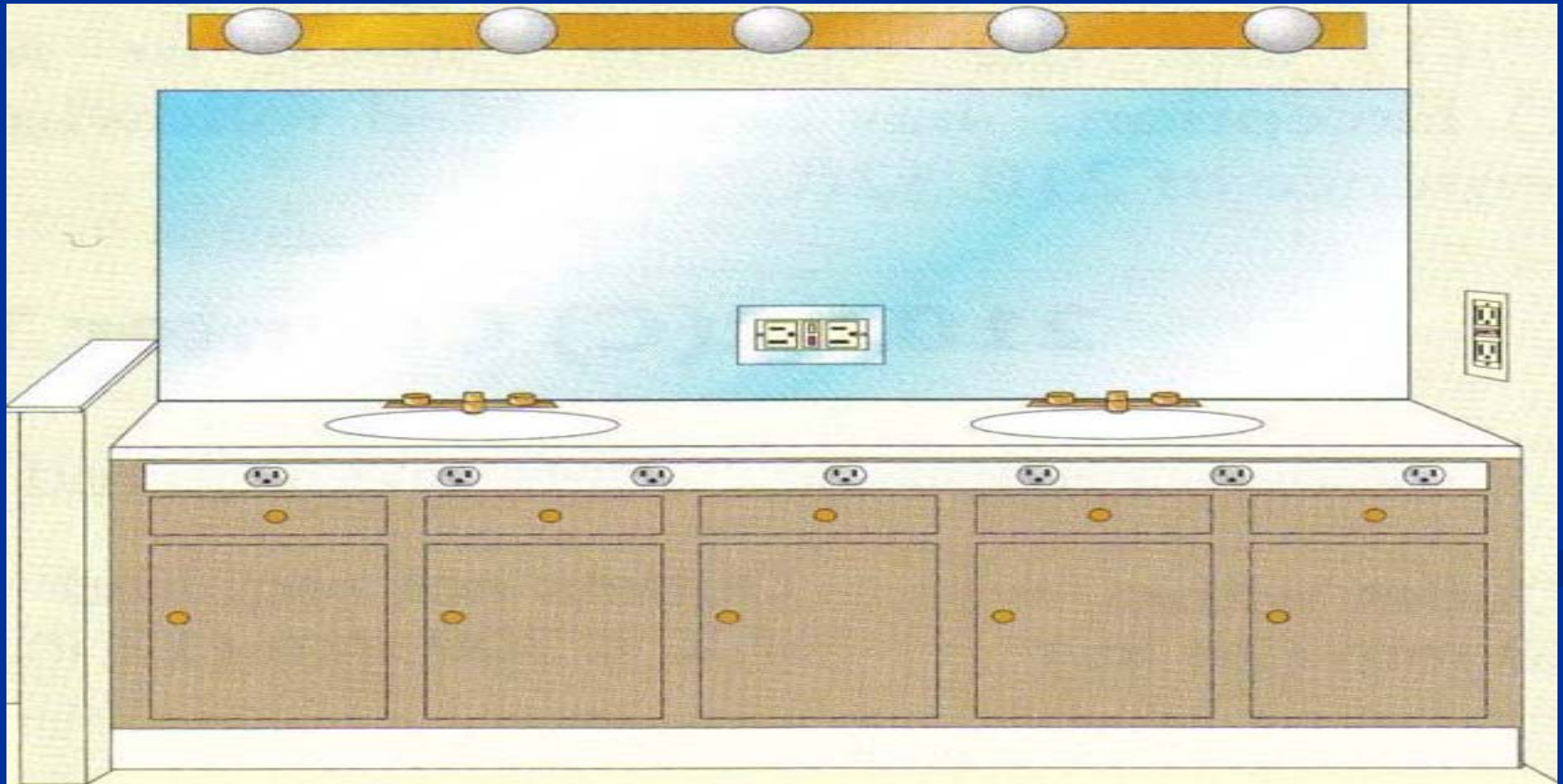
If equal to or greater than 18" a receptacle must be added.



Article 210.52(D)/ E3801.6

Bathroom Receptacles

Not required in wall or partition if installed on side or face of the basin cabinet.



Bathroom Receptacle (Continued)

- If the receptacle is installed on the front or side of the basin cabinet it cannot be located more than 12” below the countertop.



FEB 28 2007

Article 210.52 (E)

Outdoor Receptacles

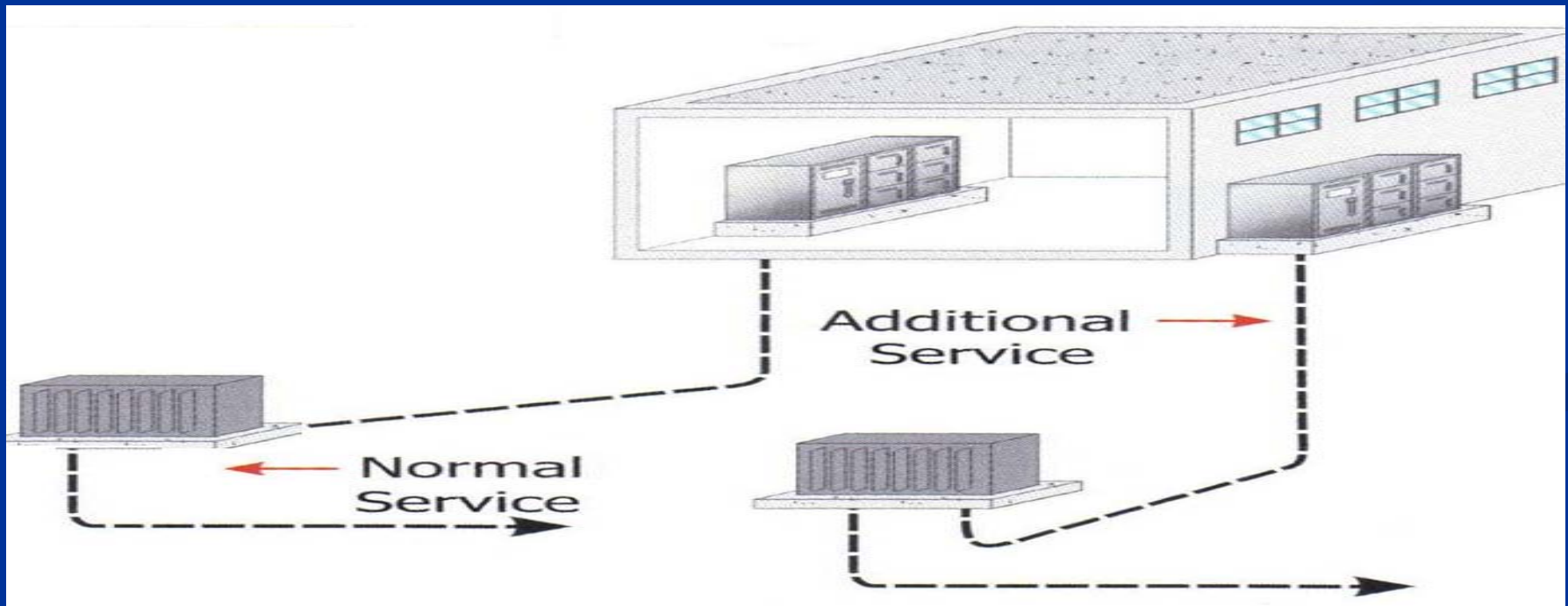
Multi-Family Dwellings: G.F.C.I. receptacles required for all units with grade level access.



Article 230.72 (B)

Additional Service Disconnecting Means

“Emergency Systems” was added to the list of service disconnecting means that are required to be located remote from the normal service location.



Note:

- Definitions of Emergency Systems are located in Article 517.2

Article 240.21 (B)

Tap Conductors

Feeders Taps: Shall have the same ampacity as the overcurrent device at the termination.



Article 250.30 (A)(2)

Grounding Separately Derived Systems

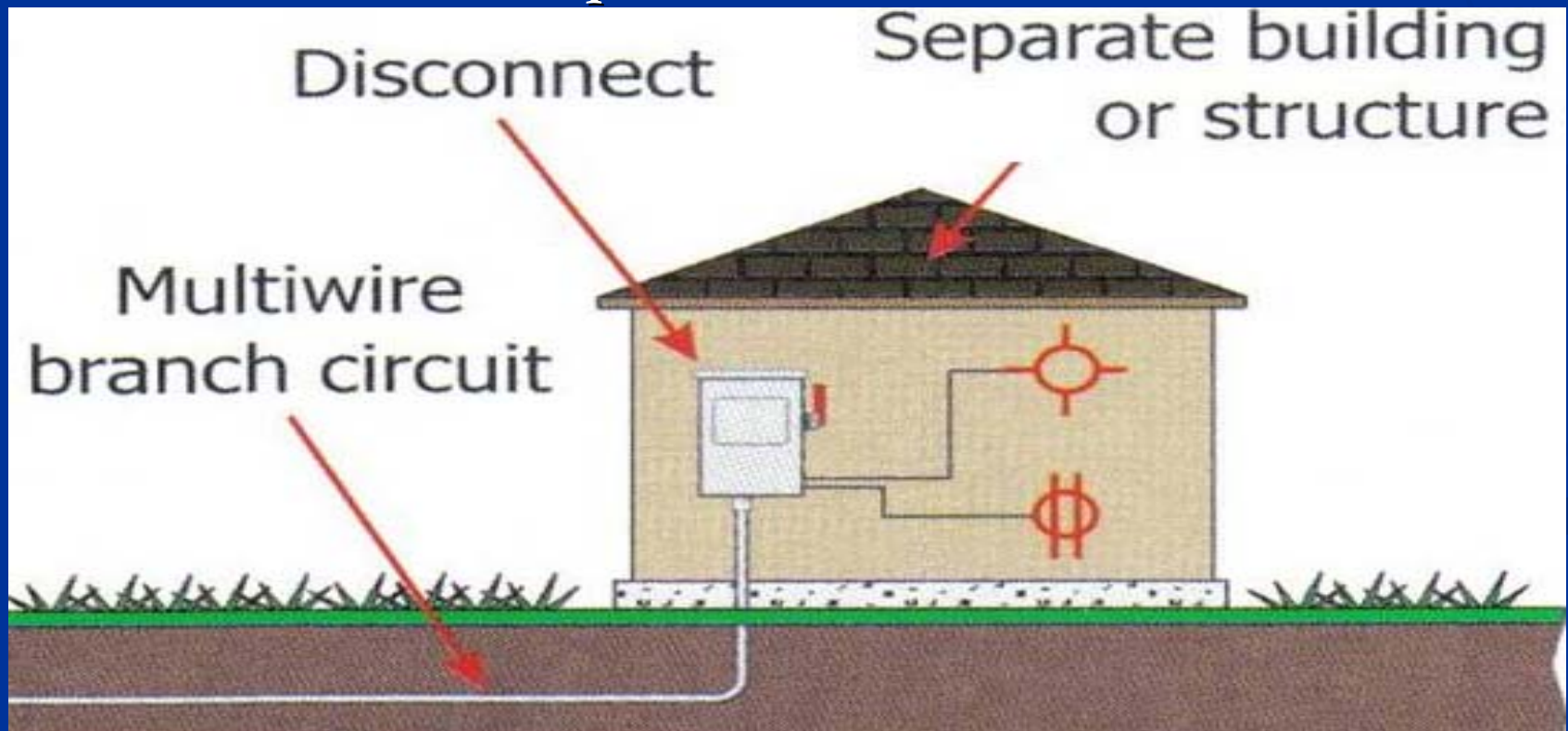
Equipment Bonding Jumper: Sizes per Article. 250.102(C) based on the size of the derived phase conductors.



Article 250.32 (A)/ E 3507.3

Buildings or Structures

Branch Circuits: Exception: Multi-wire Branch Circuit shall be considered a single branch circuit and grounding electrodes are not required.



Hot Topic

- Be aware of the distinction between a multi-wire “BRANCH CIRCUIT” and “FEEDER” conductors.

The “Ufer” Ground

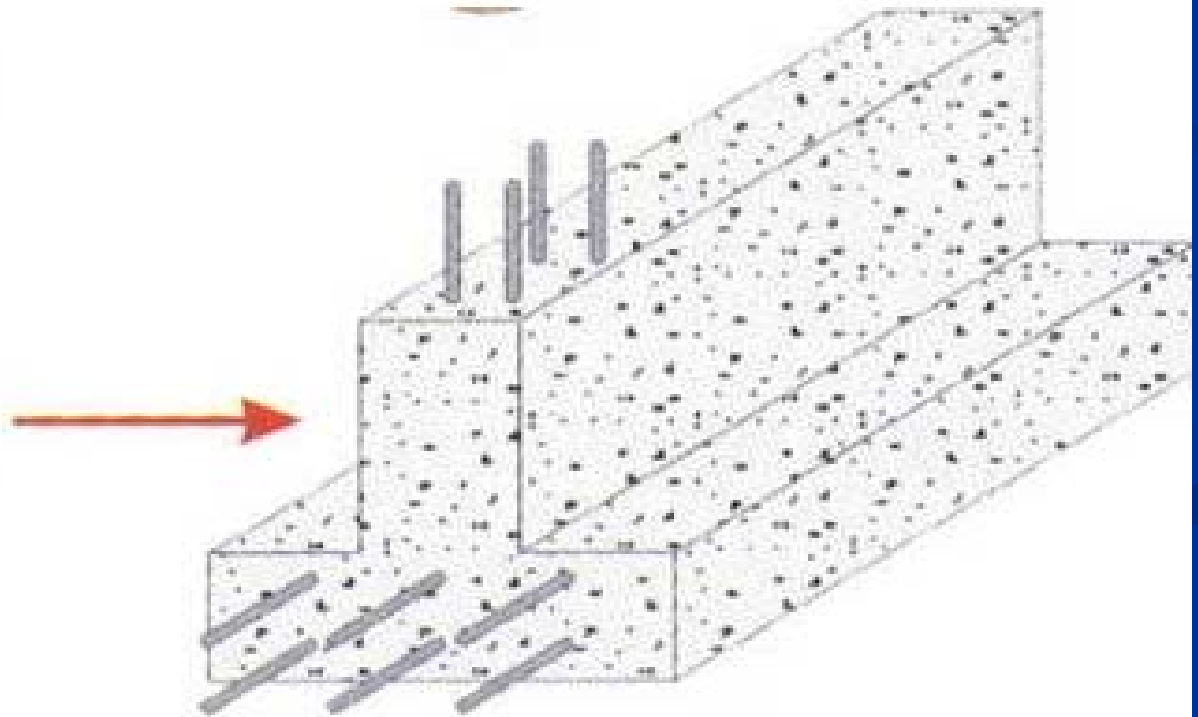
- During World War II, a retired Vice President of Underwriters Laboratories, Herbert G. Ufer, developed it for the U.S. Army. Igloo shaped bomb storage vaults were being built, and possible static and lightning induced detonation problems were of concern. Ground conductivity was poor, and to be effective enough, ground rods would have to be driven several hundred feet. After much research and testing Mr. Ufer advised the Army to make connection to the steel bar that would internally reinforce the concrete foundation. He had determined that concrete was more conductive than all but the best soil, and that this improved semiconducting characteristic would enhance surface area contact with the surrounding soil. The wire ties normally used would be extra secure, and attention would be given to bonding or welding the lattice- type network together. The Army adopted the idea, and built the vaults as
- specified. After construction ground resistance tests were made. No measurement exceeded five ohms. This value was considered extremely low for the local soil conductivity. Later tests confirmed stability. Mr. Ufer went on to develop the concept of concrete encased grounding electrodes.

Article 250.50 / E3508.1

Grounding Electrode System

Concrete Encased Electrode: If present shall be required. Exception: not required for existing buildings.

Concrete
encased



Grounding
electrode
conductor

Bolted-type connection
device or exothermic weld

Grounding
electrode

Nonmetallic protective
sleeve

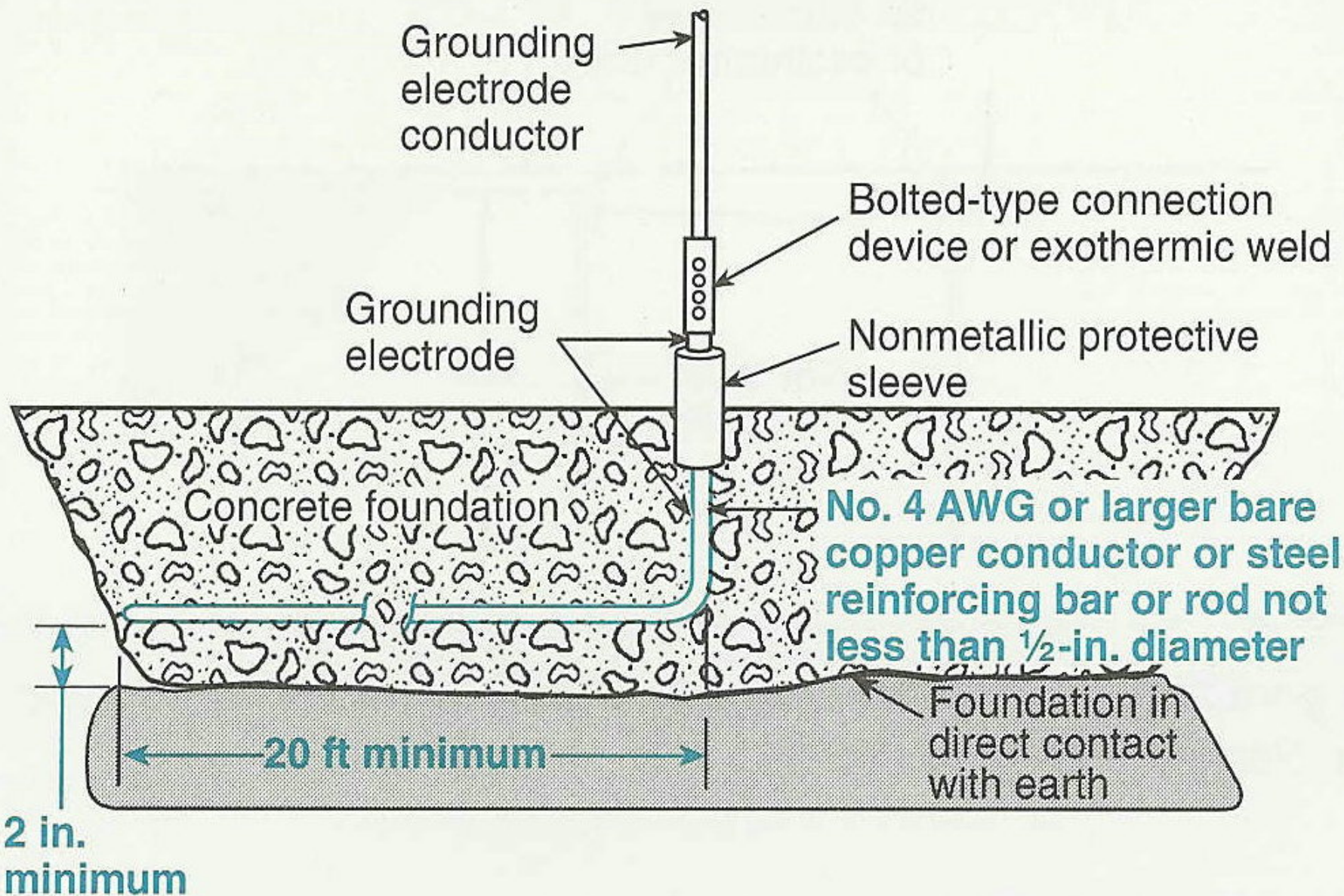
Concrete foundation

**No. 4 AWG or larger bare
copper conductor or steel
reinforcing bar or rod not
less than 1/2-in. diameter**

Foundation in
direct contact
with earth

20 ft minimum

**2 in.
minimum**



Article 252.52(A)

Electrodes Permitted for Grounding

Article 250.52 (A)(2)

Metal Frame of Building or Structure

- a. 10 ft. or more in contact with the earth or with the concrete encased electrode.
- b. Metal frame is bonded to one or more of the electrodes in 250.52(A)(1),(3),(4)
- c. Metal frame is bonded to one or more of the electrodes in 250.52(A) (5) or (6) to comply with 250.56
- d. Other Approved means of establishing a connection to the earth.



Article 250.142(B) Excep. #2 (2)

Grounded Conductor

Load-Side Equipment: Permissible to Ground the Meter Base located “immediately adjacent” to the Service Disconnect.



Article 300.18(A)/ E3702.3.2

Raceway Installations

Exception:

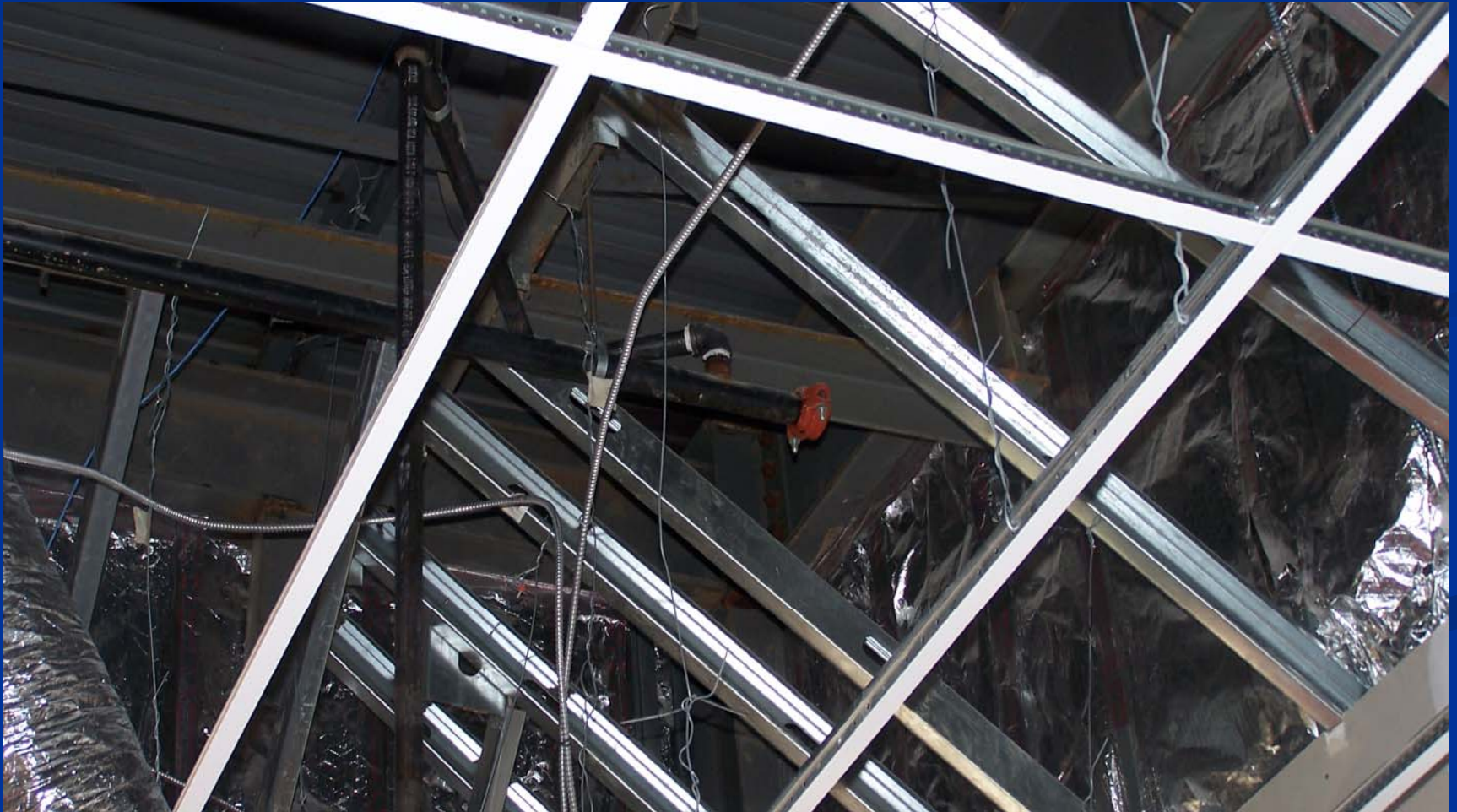
Short sections of raceways used to contain conductors or cable assemblies for protection from physical damage shall not be required to be installed complete between outlet, junction, or splicing points.




Article 300.22 (B)

Ducts or Plenums used for Environmental Air

Liquidtight flexible metal conduit NOT permitted .





Plenum
ceiling

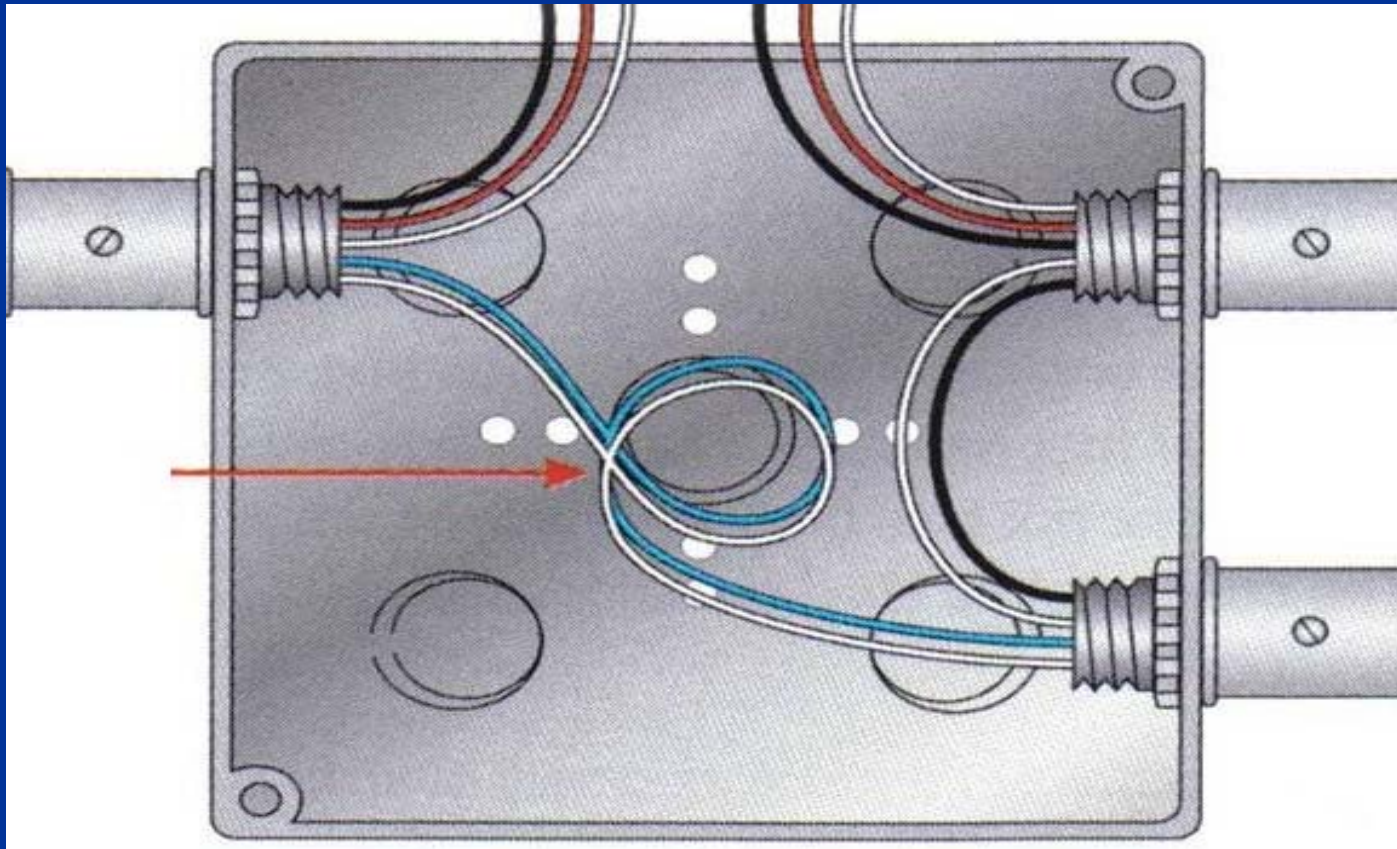
Liquidtight Flexible
Metal Conduit
Not permitted.

Article 314.16(B)(1)/ E3805.12.2

Outlet, Device, Pull, & Junction Boxes

Box Fill: Looped unbroken conductors twice the required length shall be counted twice.

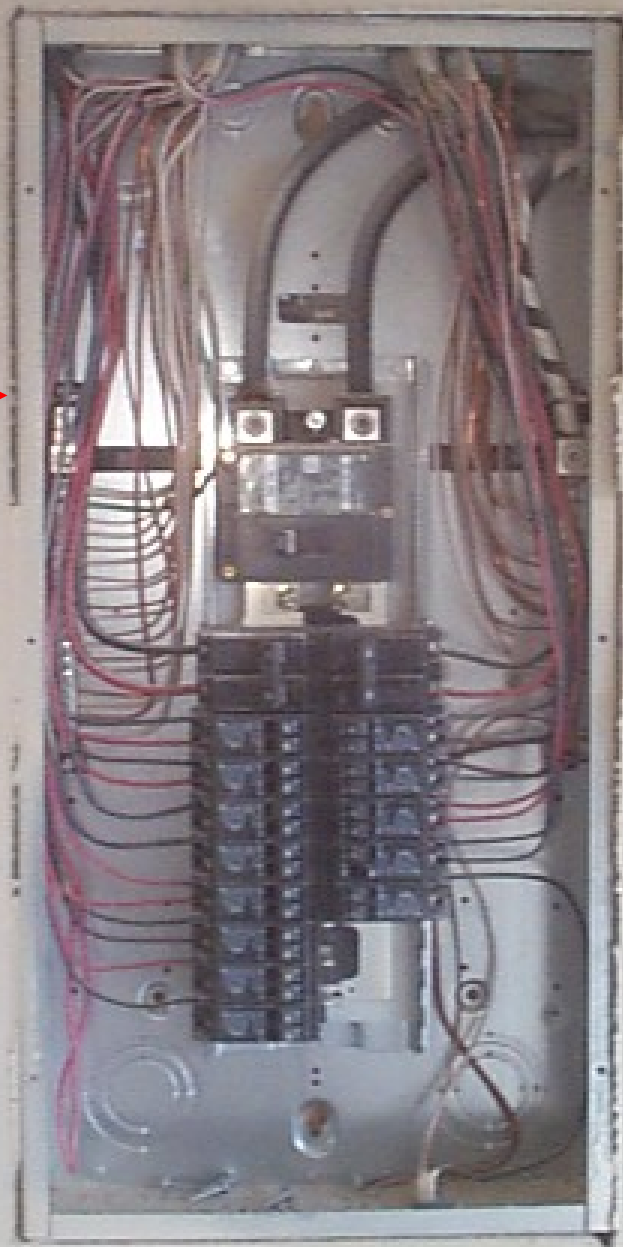
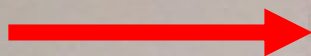
Loop



Article 312.4

Repairing Plaster and Drywall or Plasterboard

- This new section was added to include cabinets and cutout boxes.
- Article 314.21 referred only to outlet, device, pull and junction boxes.



No gaps larger than
1/8" permitted.

Ceiling Fan Boxes



Article 314.27(D)

Boxes at Ceiling-Suspended Paddle Fan Outlets

- Text has been changed to include: marking by the manufacturer as suitable for this purpose and shall not support ceiling fans that weigh more than 70 lbs. Ceiling fan boxes designed to support fans weighing more than 35 lbs shall include in the marking the maximum weight to be supported.



Article 320.12

Armored Cable

Uses Not Permitted:

1. Where subject to physical damage.
2. In damp or wet locations.
3. In air voids of masonry block or tile walls where such walls are exposed or subject to excessive moisture.
4. Where exposed to corrosive fumes.
5. Embedded in plaster finish on brick or other masonry in damp or wet locations.

Article 334.15 (B)/ E3702.4

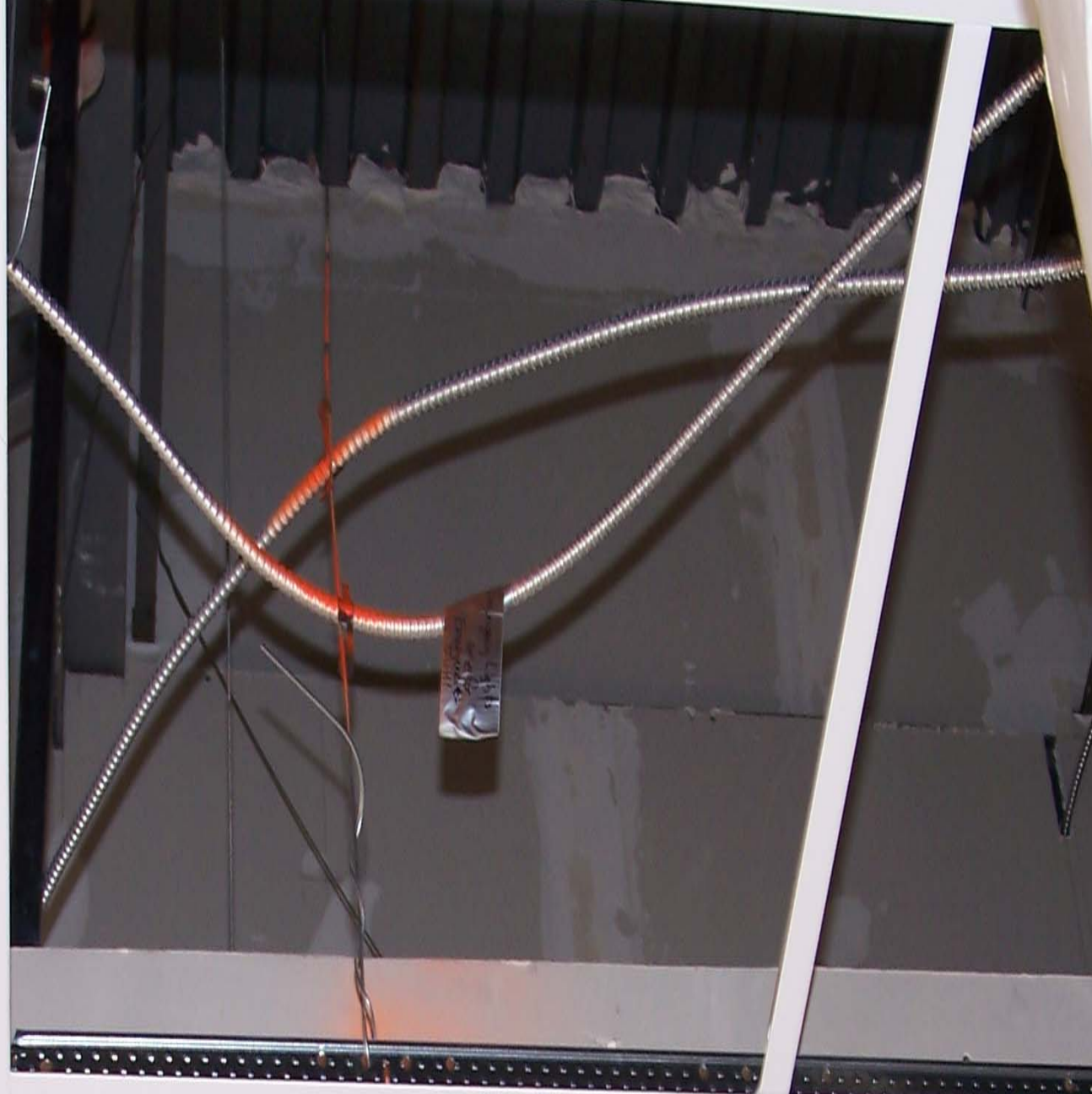
Nonmetallic-Sheathed Cables

Protection from physical damage: Added rigid metal conduit, intermediate metal conduit or other approved means.



Article 348

Flexible Metal Conduit Type FMC



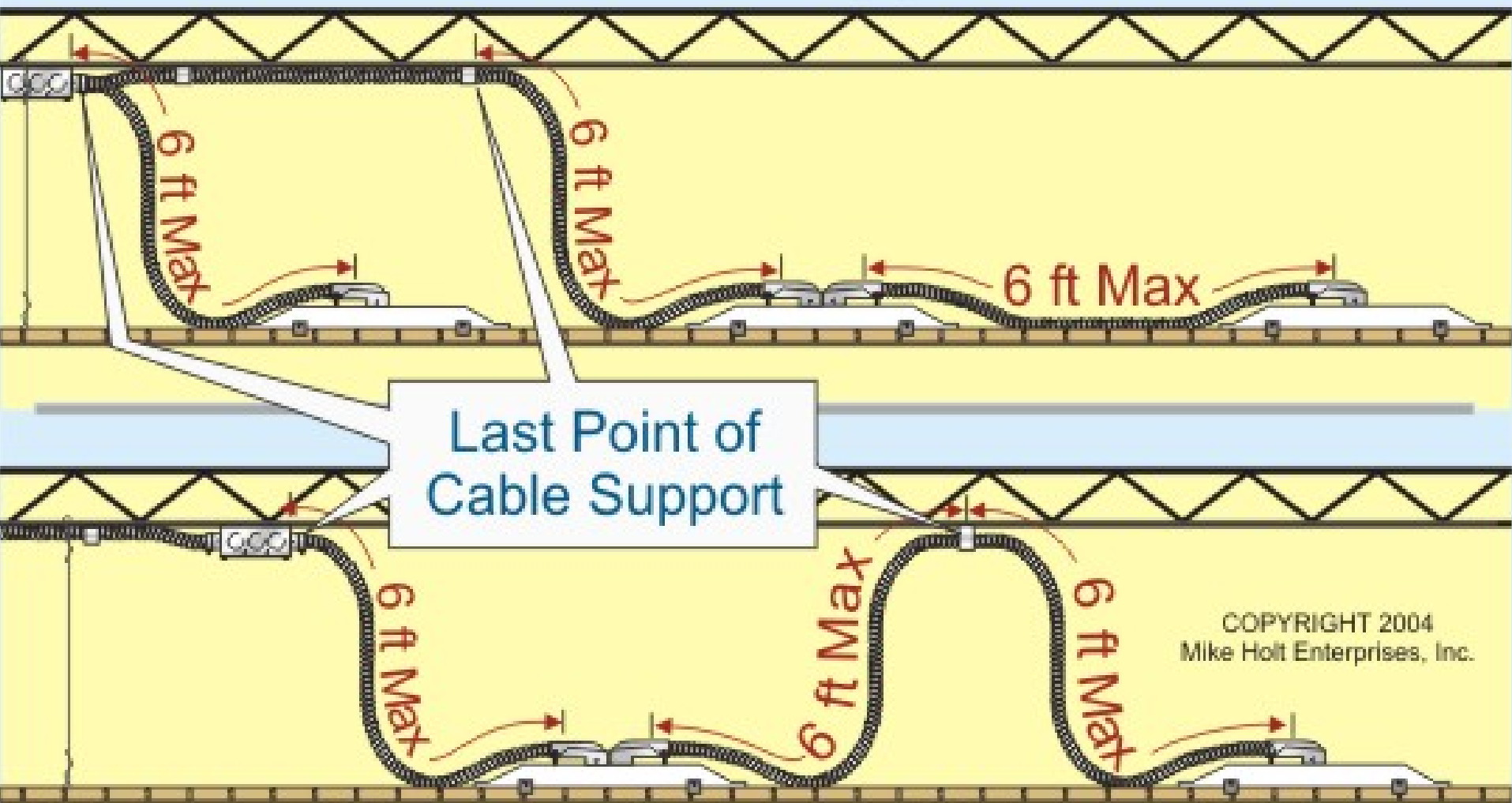
Article 348.30(A)

New Exception No. 4

- Lengths not exceeding 6' from the last point where the raceway is securely fastened for connections within an accessible ceiling to luminaires or other equipment.

FMC - Unsecured in Accessible Ceilings

Section 348.30(A) Ex 4



Lengths not exceeding 6 ft can be unsecured within an accessible ceiling for luminaire(s) or other equipment.

Note:

- Article 350.30(A) Allows for same support rules for liquid tight flexible metal conduit.

Article 362

Electrical Nonmetallic Tubing

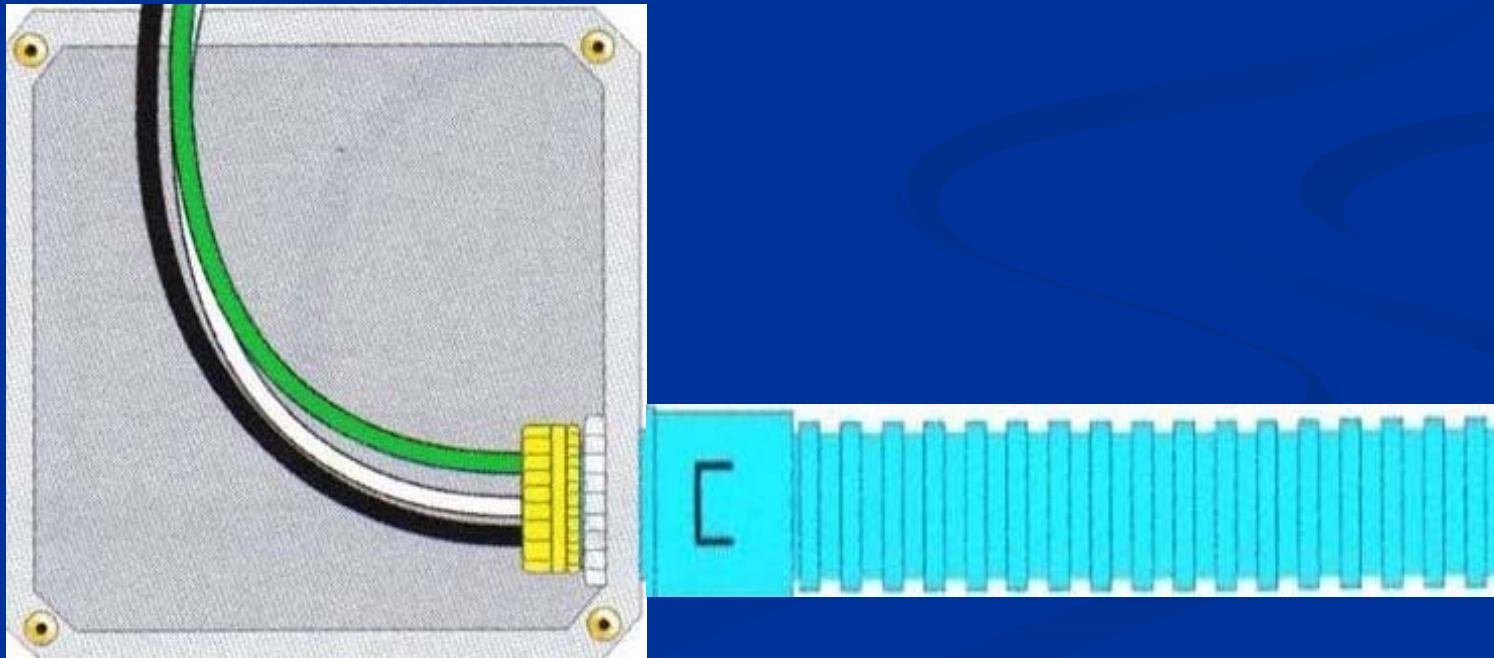
Type ENT

Article 362.12

Uses Not Permitted

Item #4 Exception

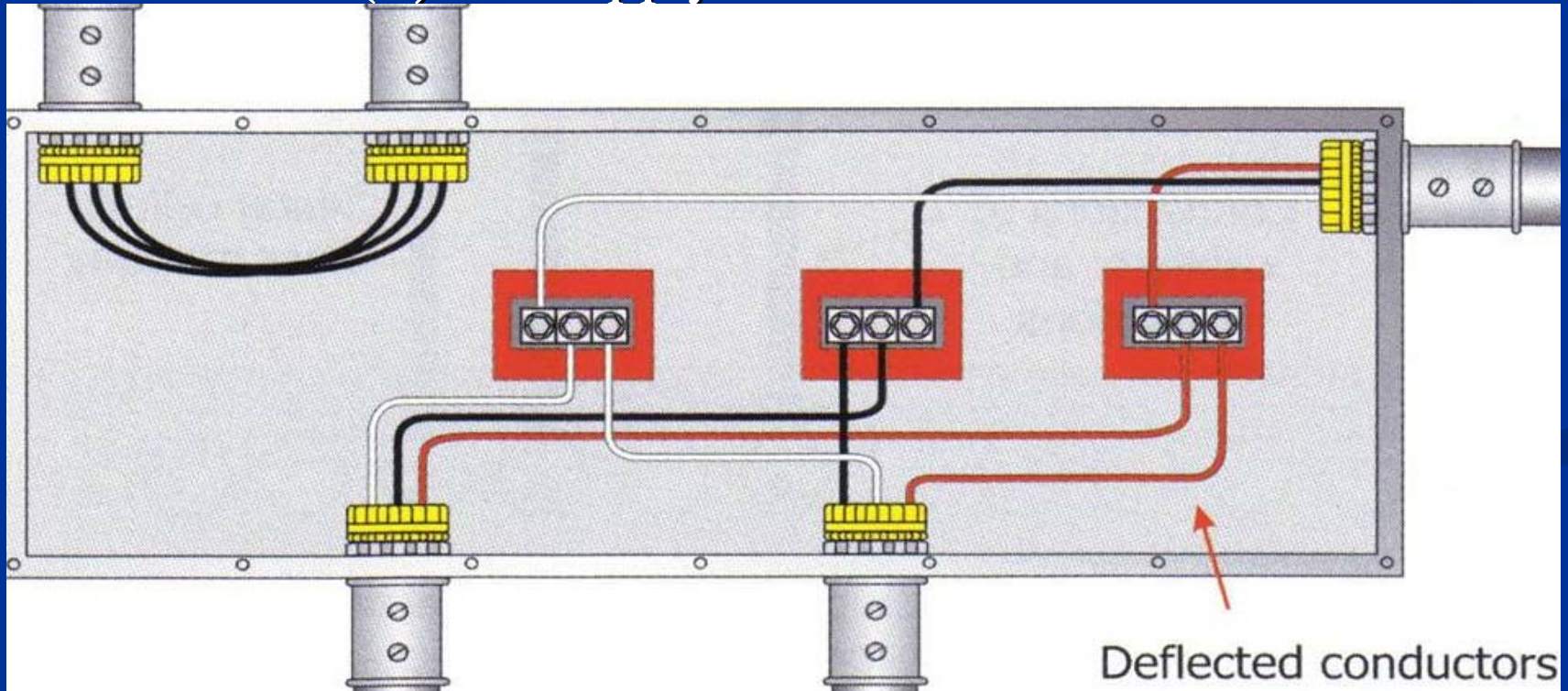
Conductors or cables rated at a temperature higher than the ENT listed temperature rating shall be permitted to be installed in ENT, provided they are not operated at a temperature higher than the ENT listed temperature.



Article 366.58(A)

Auxiliary Gutters

Deflected Insulated Conductors: Insulated conductors deflected over 30 degrees, dimensions corresponding to one wire per terminal in Column 1 of Table 312.6 (A) shall apply.



Article 386.70 & Art. 388.70

Surface Metal/Nonmetallic Raceways

Identification for combination Raceways:
Added stamping, imprinting, & color coding.

Phone



Data

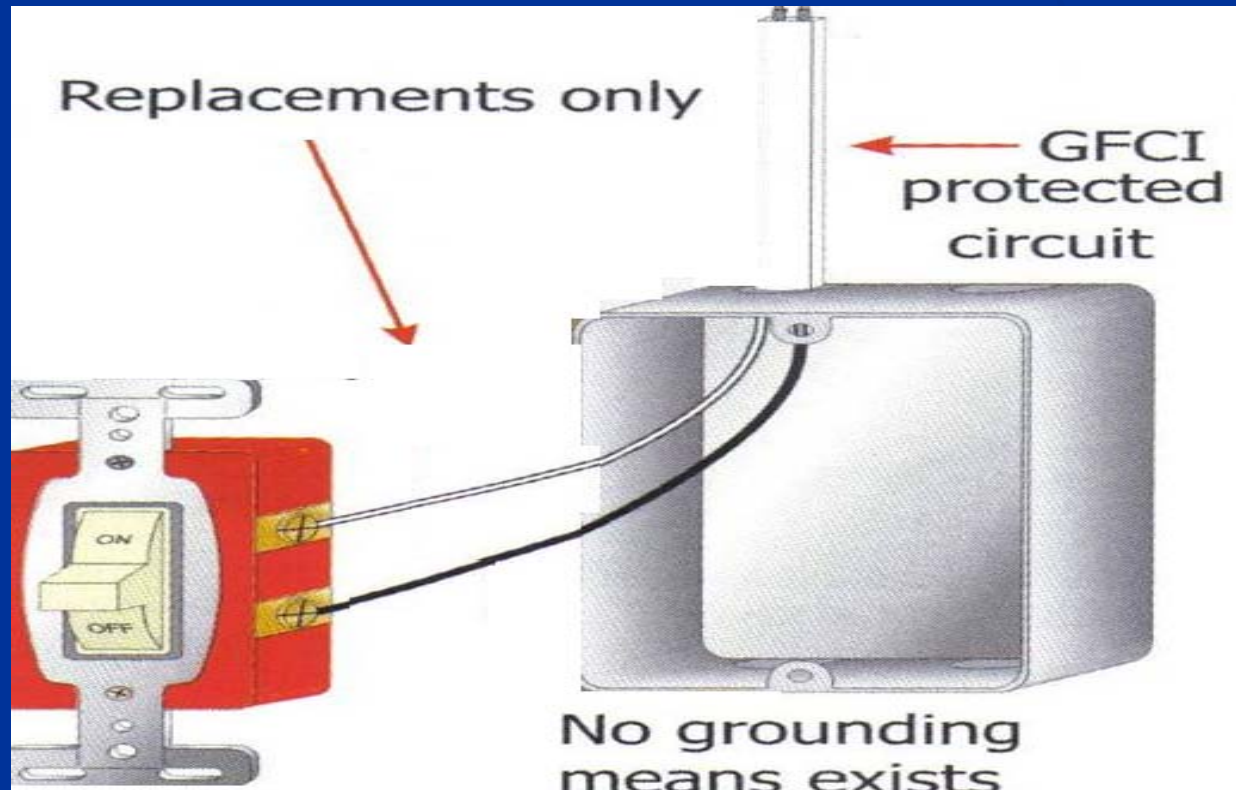
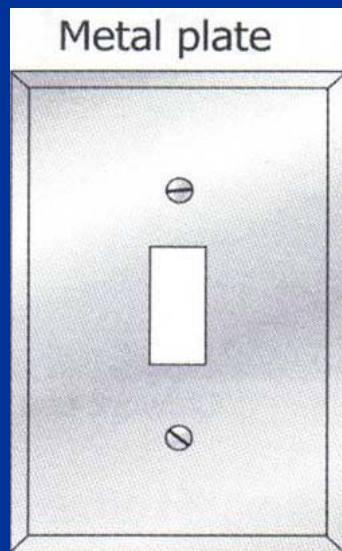


Line Voltage



Article 404.9 (B)/ E3901.11.1
Provisions for General Use
Snap Switches

Exception to (B) Grounding: Metal plates allowed with G.F.C.I. protection when no grounding means exists.



Article 406.8(B)(1)/ E3902.10

Receptacles in Damp or Wet Locations

Wet Locations: 15 and 20 ampere, 125 and 250 volt receptacles installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted.



Note:

- The word “OUTDOOR” was removed to include wet locations found indoors.

Weatherproof
Enclosure



Article 408.4 / E3606.2

Switchboards and Panelboards

Circuit Directory and Identification: Every circuit shall be legibly labeled for its clear use and specific purpose.



Article 408.4

(Continued)

- The identification shall include sufficient detail to allow each circuit to be distinguished from all others.

SEPTIC PUMP			JACUZZI
SEPTIC ALARM			Well
HEATER			Well
HEATER			OFFICE BASE BOARD HEATER
Lighting			OFFICE BASE BOARD HEATER
Lighting			Bathroom Recept.
Basement Lighting			WASHER
Lighting			Kic. & Hb. Recept.
Lighting			Lighting
OFFICE Lighting			Bathroom BASE BOARD HEATER
Refrige			Cupbrn BASE BOARD HEATER
Dishwasher			Lighting
GARAGE Sep. CIRCUIT			"
DRYER			"

1 GAS FURNACE

3 GARAGE

5 2ND FLOOR
SITTING ROOM

7 UP HALL LTS
UP BATH LTS

9 REF / DINING

11 BATH RECEPT

13 1/2 KIT

15 MICRO

FAMILY

FOYER / DINE LTS
DOWN BATH LTS

COOK TOP

DOWN MASTER
BATH LTS

UP MASTER
BATH LTS

KIT LTS
DOWN LTS

SPARE

SPARE

2

4

6

8

10

12

14

16

Article 410.4 (E)

Luminaires, Lampholders, & lamps

Outdoor Sports, Mixed Use & All Purpose Facilities:

Fixtures subject to physical damage using mercury vapor or metal halide bulbs, will require a plastic or glass lens.



Article 410.4(D)

Luminaires in Bathtub and Shower Areas

- The word “hanging” has been replaced with: chain, cable, or cord suspended luminaires, shall not have any parts located within a zone measured 3’ horizontally and 8’ vertically from the top of the bathtub rim or shower stall threshold.
- Luminaires located in this zone shall be listed for damp location or listed for wet location where subject to shower spray.



These luminaires not permitted in zone
3' horizontally and 8' vertically from top
of bathtub rim or shower stall threshold.



Must be rated for wet location.



Not approved for wet location

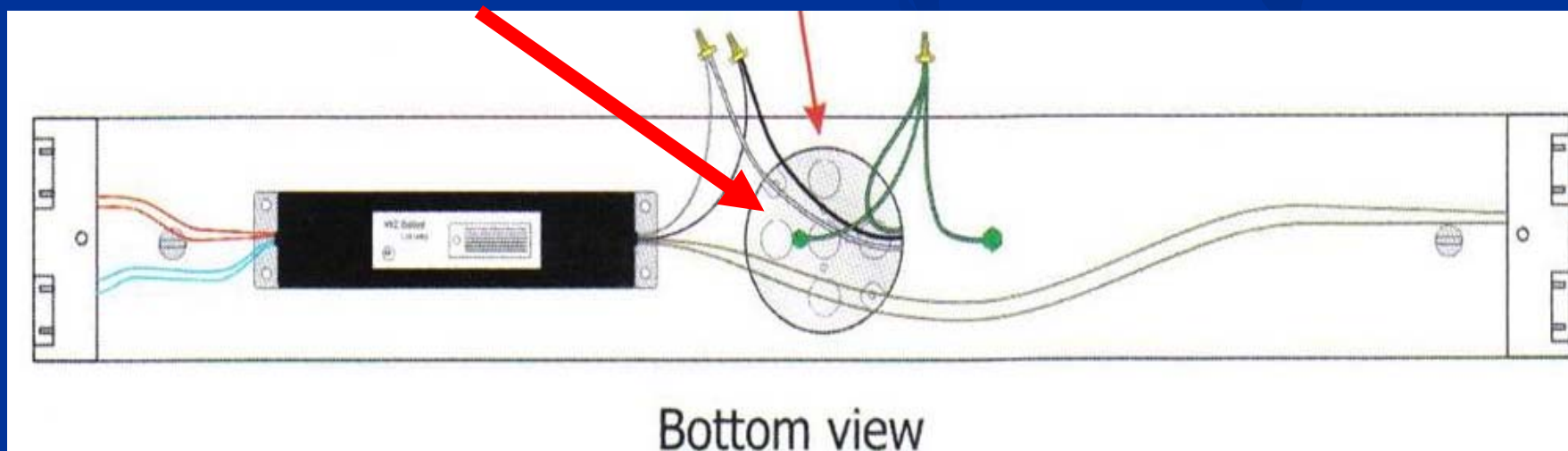
Article 410.14

Connection of Electric-Discharge Luminaires

Article 410.14(B) / E3904.3

Access to Boxes

Electric-discharge luminaires surface mounted over concealed outlet, pull and junction boxes and designed not to be supported solely by the outlet box shall be provided with suitable opening in the back of the luminaire to provide access to the wiring in the box.



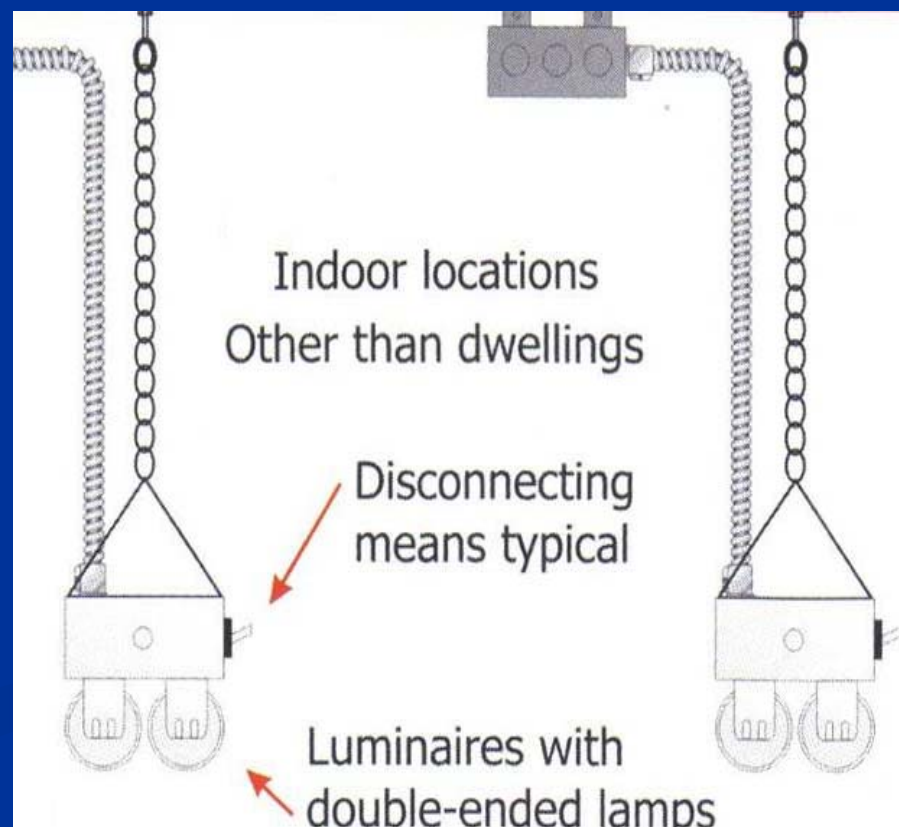
Article 410.73 (G)

Disconnecting Means

Disconnecting means required for all conductors of the ballasts of fluorescent luminaires, to allow them to be serviced in place. Effective- January 1, 2008.

Exceptions: Not Required

1. Hazardous locations
2. Emergency lighting
3. Cord & Plug Connections
4. Industrial Use
5. Multiple fixtures/circuits

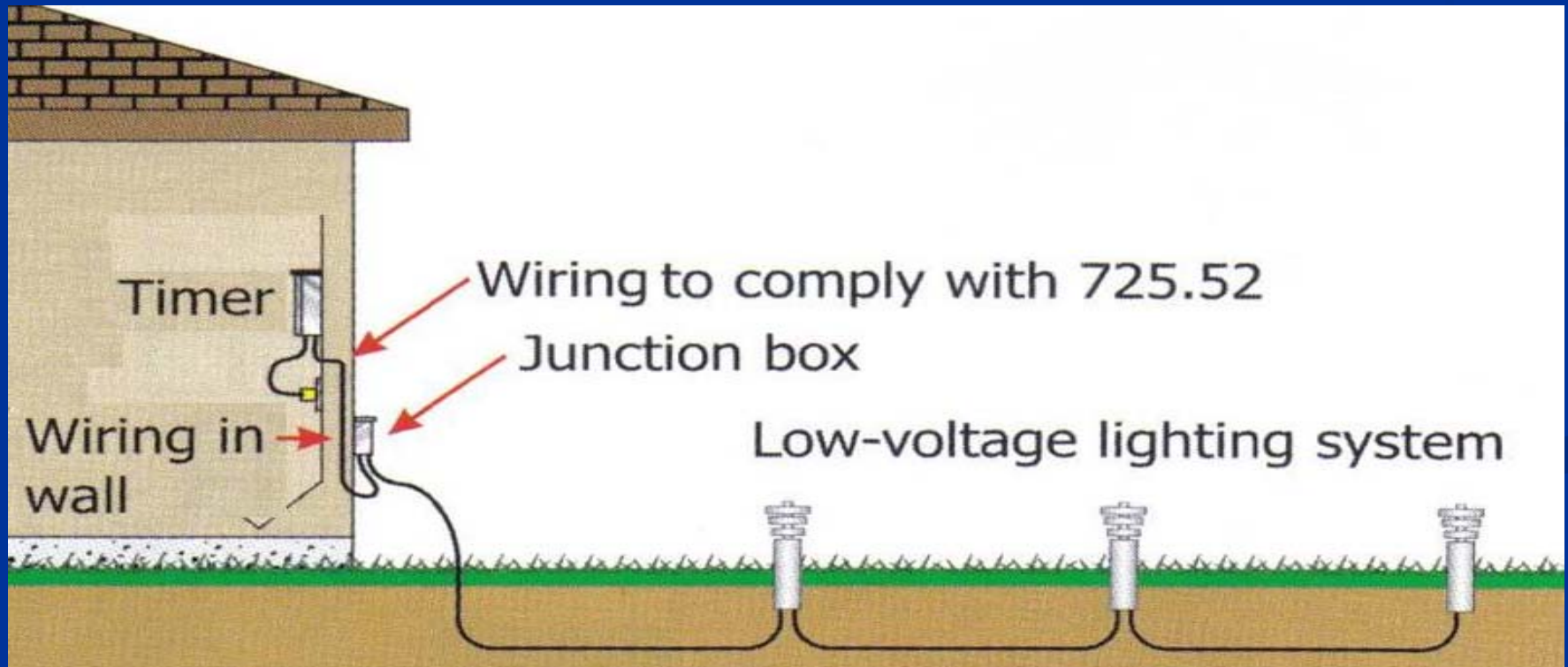




Article 411.4

Lighting Systems Operating at 30 volts or less

Locations not Permitted: Wiring in concealed spaces required to be methods specified in Chapter 3 or comply with Article 725.52.



Note:

- Article 725.52 recognizes Class 2 systems as suitable as for this type of installation.

Article 422.16(B)(4)

Range Hoods

- Range hoods shall be permitted to be cord and plug connected with a flexible cord identified as suitable for the use on range hoods in the installation instructions of the appliance manufacturer, where all the following conditions are met.

422.16(B)(4) Cont.

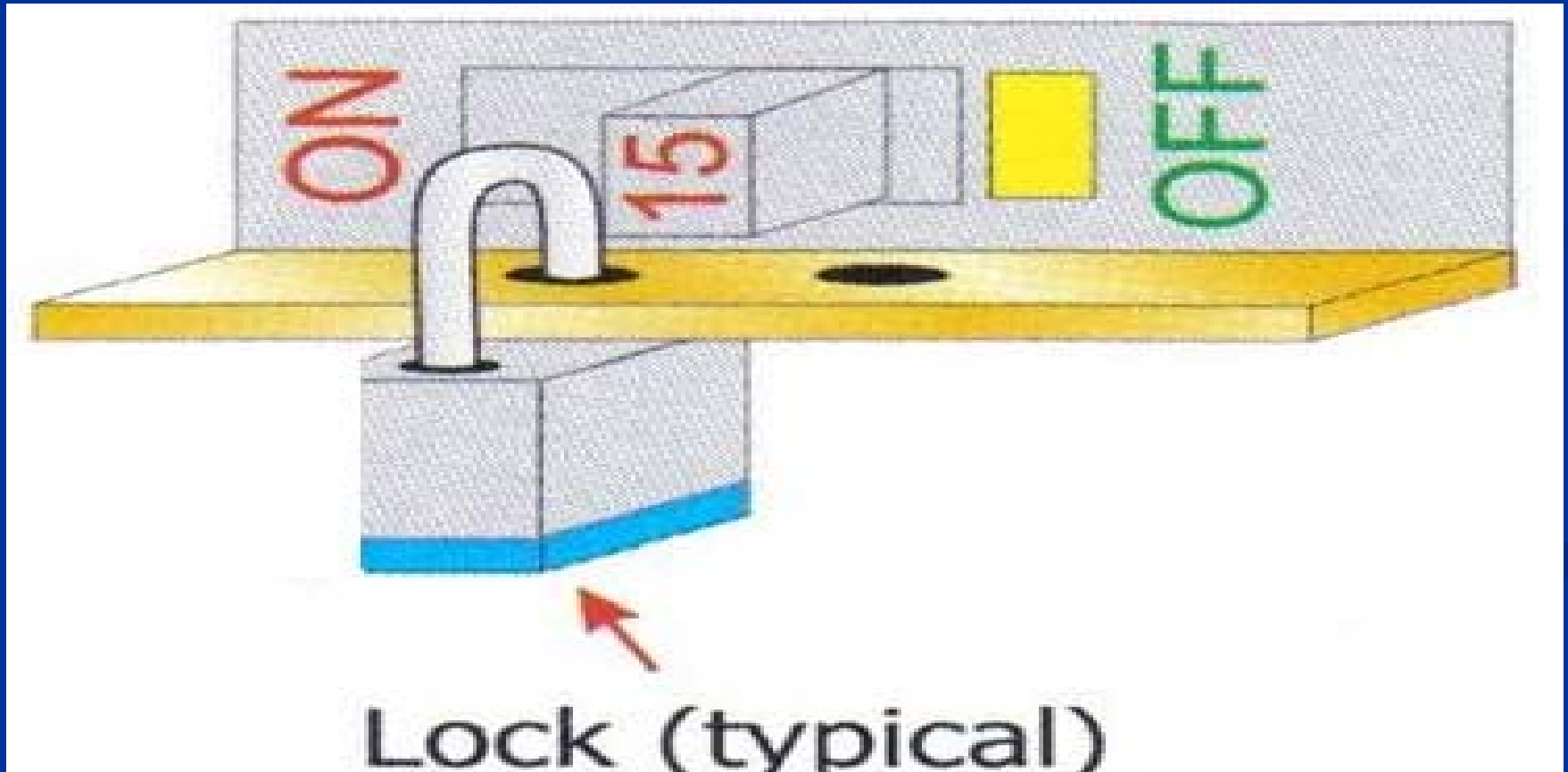
1. The flexible cord is terminated with a grounding type attachment plug.
2. The length of the cord: not less than 18” and not over 36”.
3. Receptacles are located to avoid physical damage to the cord.
4. The receptacle is accessible.
5. The receptacle is supplied by an individual branch circuit.



Article 422.31 (B) / E4001.5

Appliances

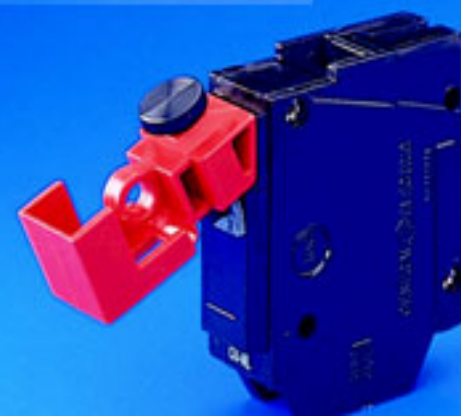
Disconnecting Means: Locking device to remain in place with or without the lock installed.



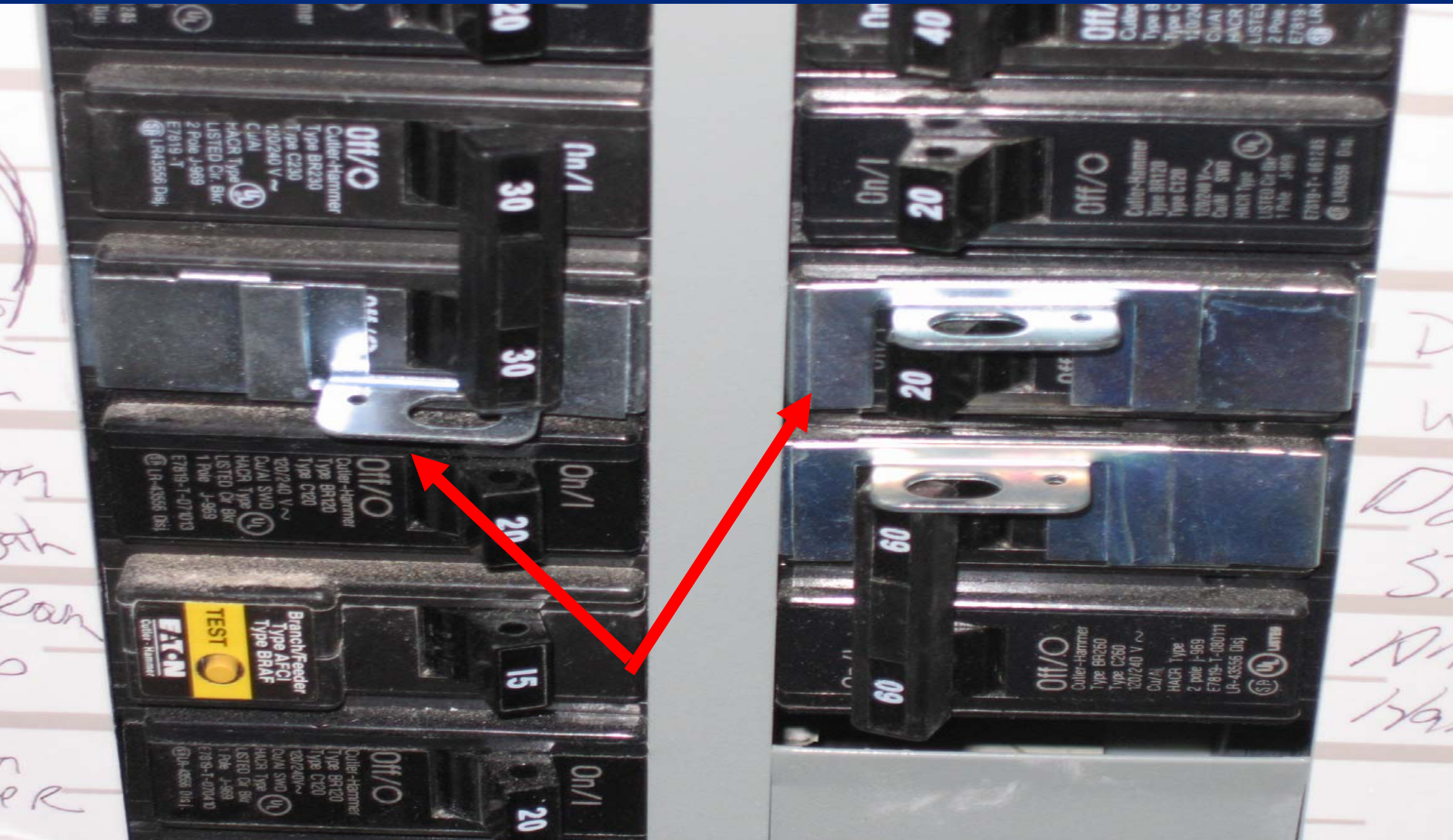
Article 422.31(B)

- The new wording makes it clear that the locking device for appliances over 300volt amperes or 1/8 hp must remain in place with or without the lock installed.

Lockout Devices Not Permitted



Lockout Devices Permitted



Article 422.51

Cord and Plug Connected Vending Machines

Cord and plug
connected vending
machines
manufactured or
remanufactured
after January 1, 2005
shall include a
G.F.C.I. protection.



Article 511.3

Commercial Garages

Unclassified Areas: New requirements for adequate ventilation.



Article 511.3

Notes:

Reorganized:

- Section (A) Contains all requirements and information related to unclassified spaces.
- Section (B) Contains all requirements and information related to classified spaces.

Article 511.7 (A) (1)

Commercial Garages

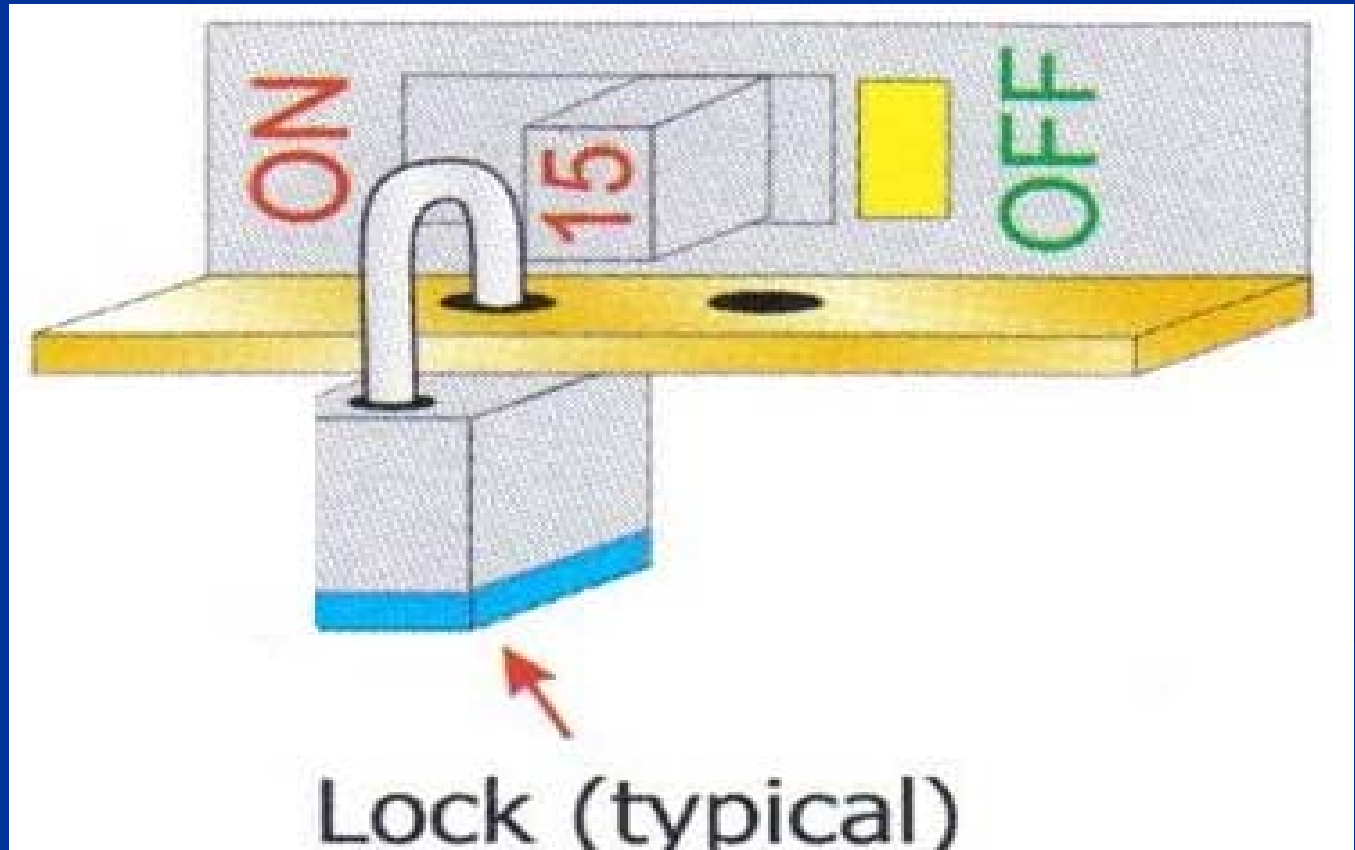
Fixed Wiring above Class 1 Locations: Type A/C was added to the list of approved wiring methods.



Article 514.13

Motor Fuel Dispensing Facilities

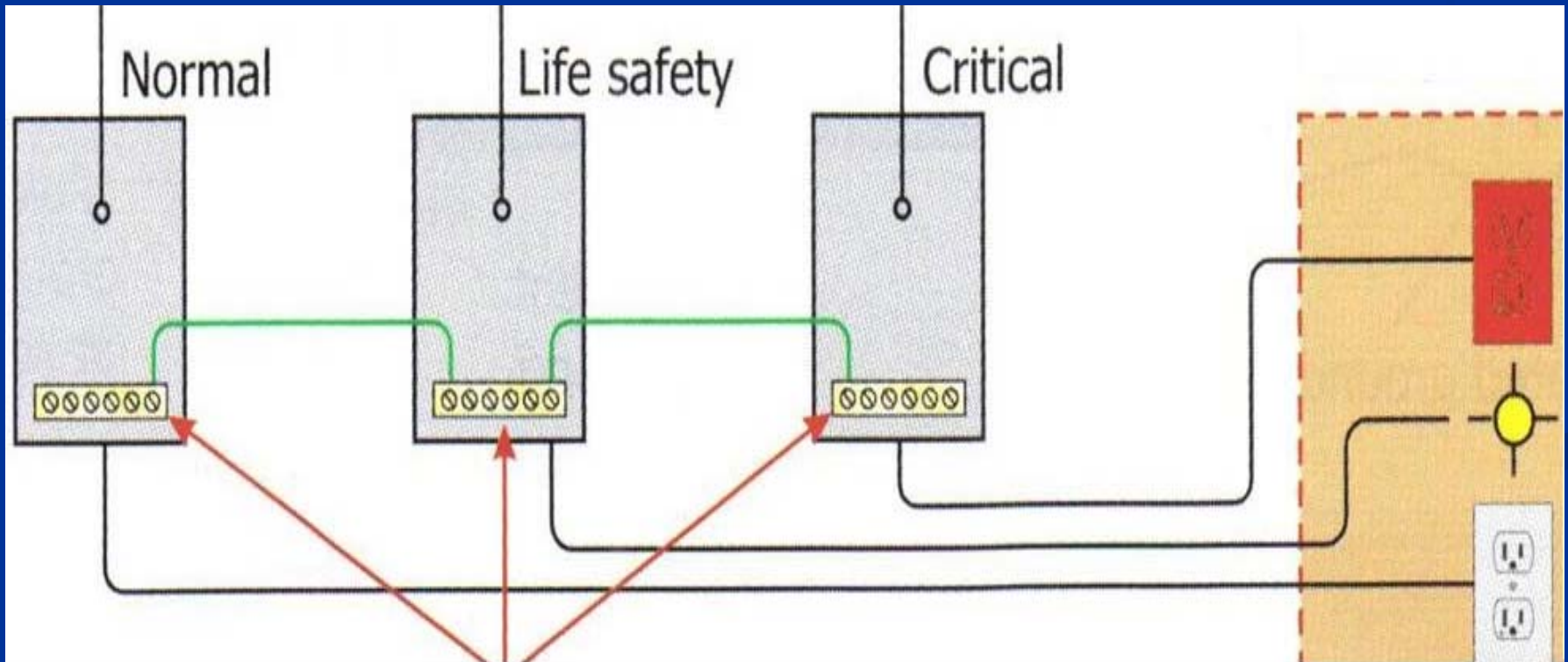
Disconnecting Means: Shall be lockable in open position.



Article 517.14

Health Care Facilities

Panelboard Bonding: All panelboards serving the same patient vicinity shall be bonded together with #10cu.



517.14

Notes:

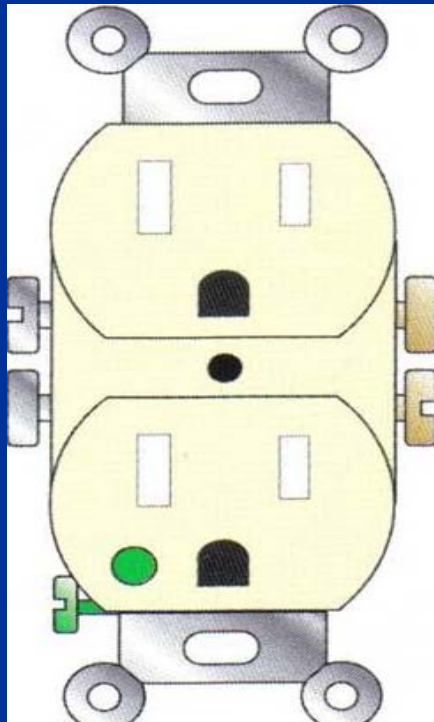
- Rewording to specify two or more panelboards instead of more than two.
- Added wording to make it clear that even though those panelboards serving the same patient vicinity are supplied through separate transfer switches they still must be bonded together.

Article 517.18 (C)

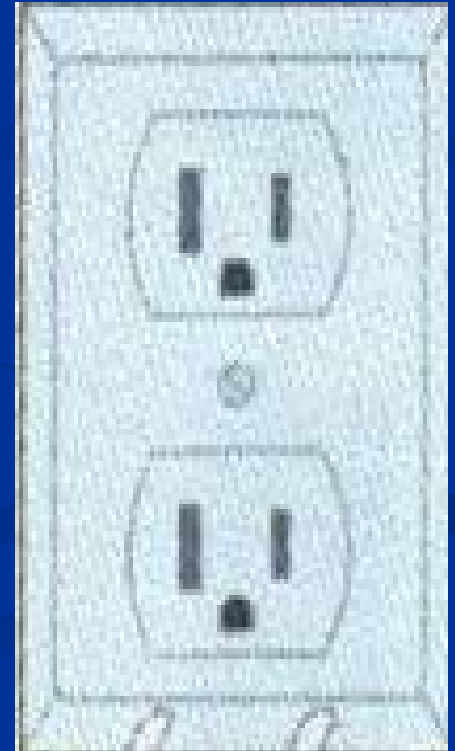
Health Care Facilities

Receptacles Pediatric locations: Tamper resistance expanded to include bathrooms, playrooms, and activity rooms.

Tamper
Resistant
Outlet



Tamper
Resistant
Cover
Plate

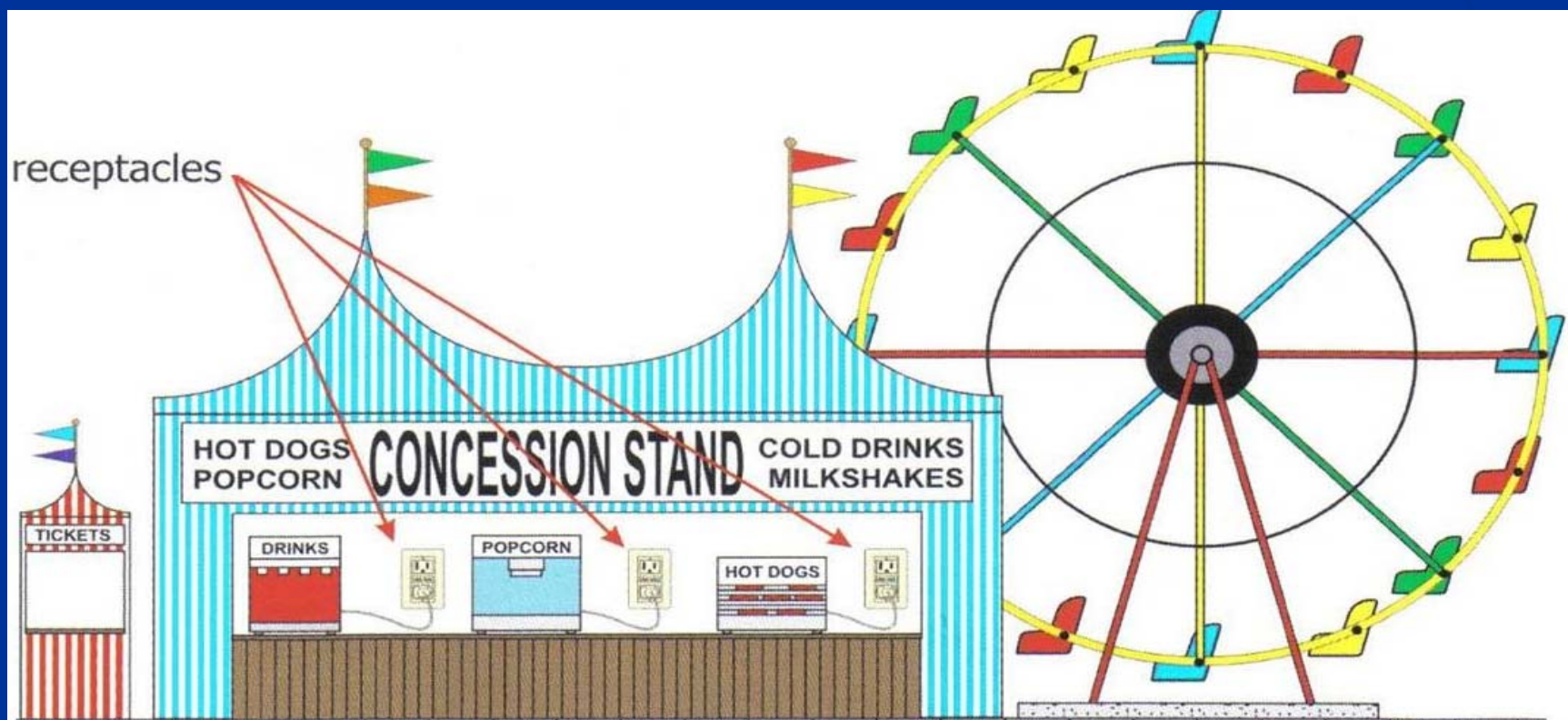




Article 525.23

Carnivals, Circuses, Fairs

Revised G.F.C.I. protection requirements
under new heading (A), (B) and (C).



Article 555.22
Marinas and Boatyards
Repair Facilities

Now considered a Hazardous location and
must comply with Article 511.



Article 605.7

Office Furnishings

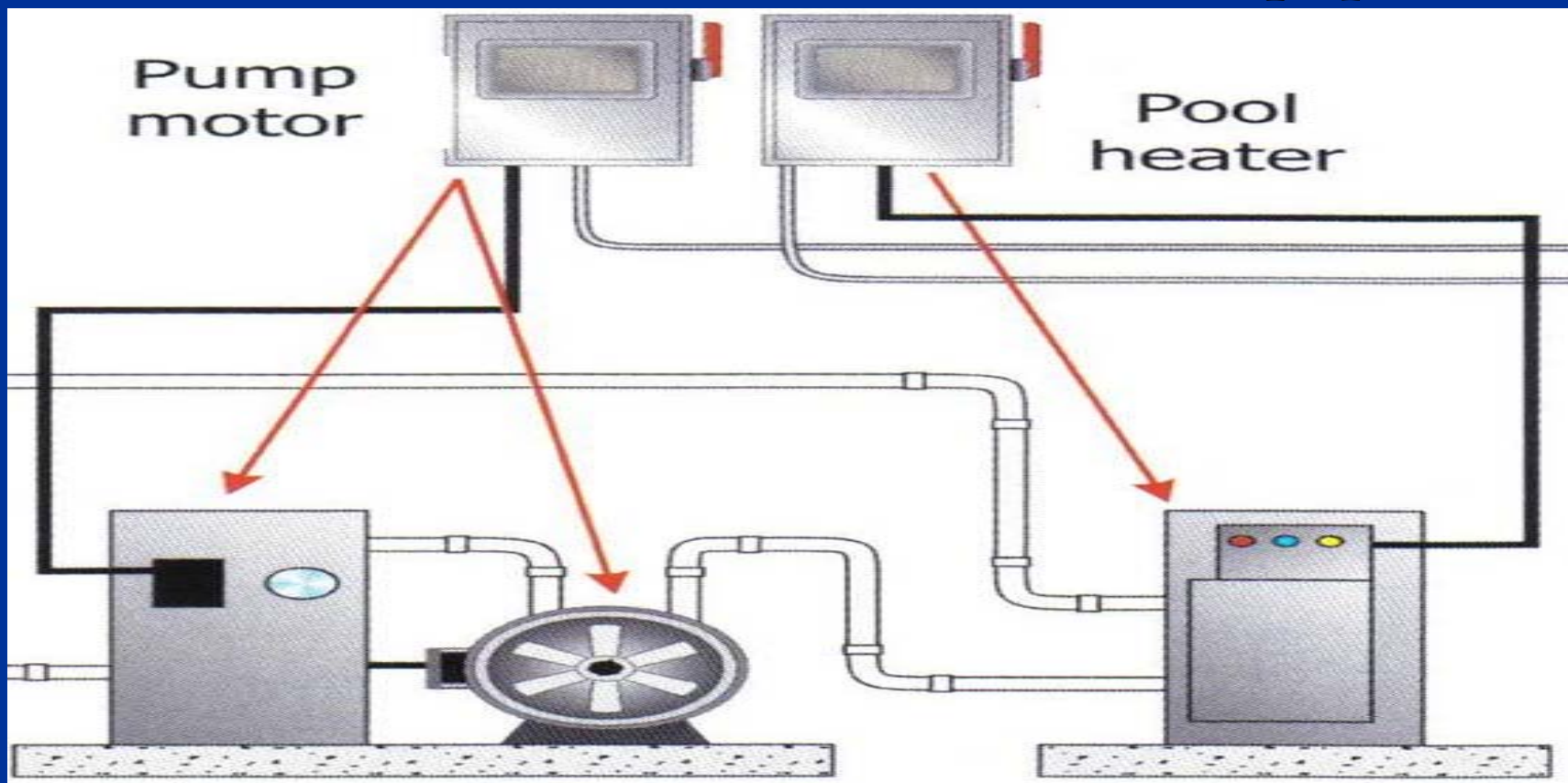
Freestanding-Type Partitions: Handle Ties Shall be provided for Multi-wire branch circuits.



Article 680.12/ E4103.3

Swimming Pools

Disconnecting Means: Now required to be “Readily Accessible” for all utilization equipment.



Readily Accessible

- Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth.



Article 680.23(A)(2)

Underwater Lighting Fixtures

- New listing requirements for transformers used for underwater lighting fixtures:
- Shall be listed as a swimming pool or spa transformer.

Article 680.23(B)(6)

Servicing (Wet Niche Luminaires)

- Wet niche luminaires shall be removable for re-lamping or normal maintenance. Luminaires must be installed in such a manner that personnel can reach the luminaire for re-lamping, maintenance, or inspection while on the deck or equivalently dry location.



Photo 2. Flexible cord coiled around wet-niche luminaire as it is installed in the forming shell. Such extra length of flexible cord length is needed to permit luminaire to be removed from forming shell and placed on pool deck where it is then unsealed for lamp replacement.

Article 680.23(F)(1)
Wiring Methods
Underwater Luminaires

- Where installed within a building, type MC cable has been added as an approved branch circuit wiring method for wet-niche and dry-niche luminaires.

Hot Topic

Equipotential Bonding Grid

Article 680.26(C)

Equipotential Bonding Grid

- **CONDUCTIVE MATERIAL POOLS:**
Poured concrete, Sprayed concrete, concrete block with painted or plastic coatings.
- **NONCONDUCTIVE MATERIAL POOLS:**
Vinyl lined polymer wall, fiberglass composite, or other nonconductive material.

Conductive Material Pools

Paved Decks

- The equipotential bonding grid shall conform to the contours of the pool and shall extend within or under “paved” walking surfaces for 3’ horizontally beyond the inside walls of the pool.
- The parts specified in 680.26(B) shall be connected to this grid with a solid #8 copper conductor or other means specified. Connections shall be made in accordance with 250.8.

Nonconductive Material Pools

Paved Decks

- The equipotential bonding grid shall conform to the top edge contour of the pool only and shall extend within or under “paved” walking surfaces for 3’ horizontally beyond the inside walls of the pool.
- Where deck reinforcing steel is not an integral part of the pool, the deck reinforcing steel shall be bonded to other parts required by 680.26(B). Connections shall be made in accordance with 250.8.

Note:

- Welded steel mesh may be used as bonding grid in poured concrete deck.

Alternate Means

- If equipotential bonding grid is to be placed under the paved walking surface then you must use the Alternate Means of grid construction described in 680.26(C)(3).

Article 680.26(C)(3)

Alternate Means

- The Grid shall be constructed of minimum #8 bare solid copper conductors and shall be bonded to each other at all points of crossing. Connections shall be made as required by 680.26(D).
- The grid shall cover the contour of the pool and the pool deck extending 3' horizontally from the inside walls of the pool. The grid conductors shall be arranged in a uniformly spaced 12"x 12" pattern.

3' X 100' Roll

\$680.00



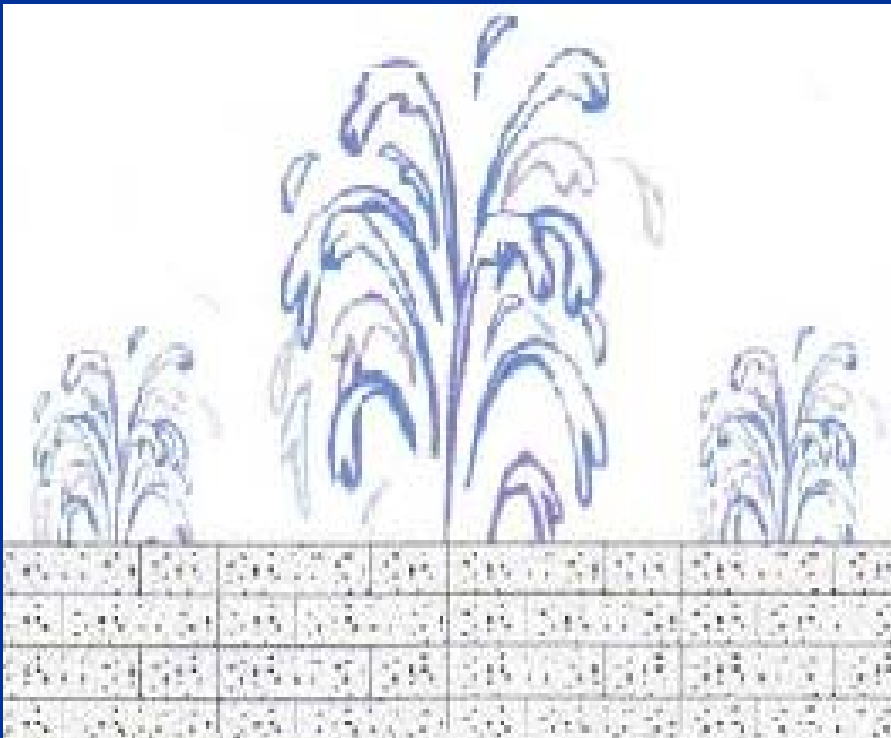


Minimum 3'

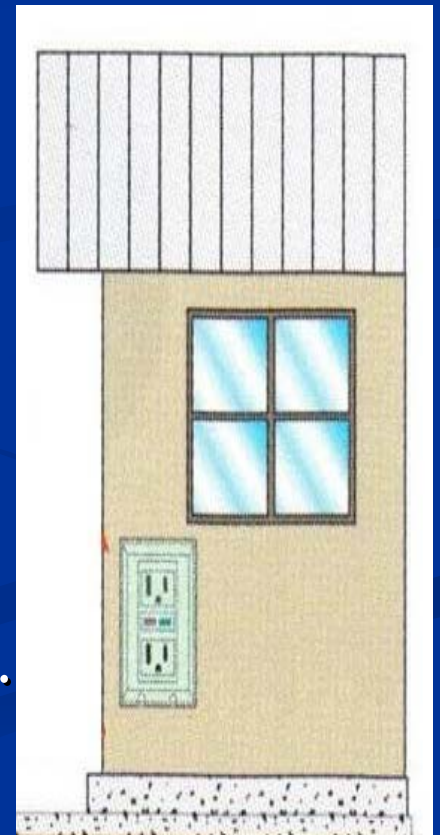
Article 680.58

Fountains

G.F.C.I. Protection Adjacent Outlets: Required for all 15 & 20 ampere 125 volt receptacles with-in 20 ft. of fountains.



with-in 20 ft.



Article 680.74/ E4109.4

Hydro massage Bathtubs

Bonding: All metal piping systems and all grounded metal parts in contact with circulating water shall be bonded with #8 cu.



Article 695.4 (B) (2)

Fire Pumps

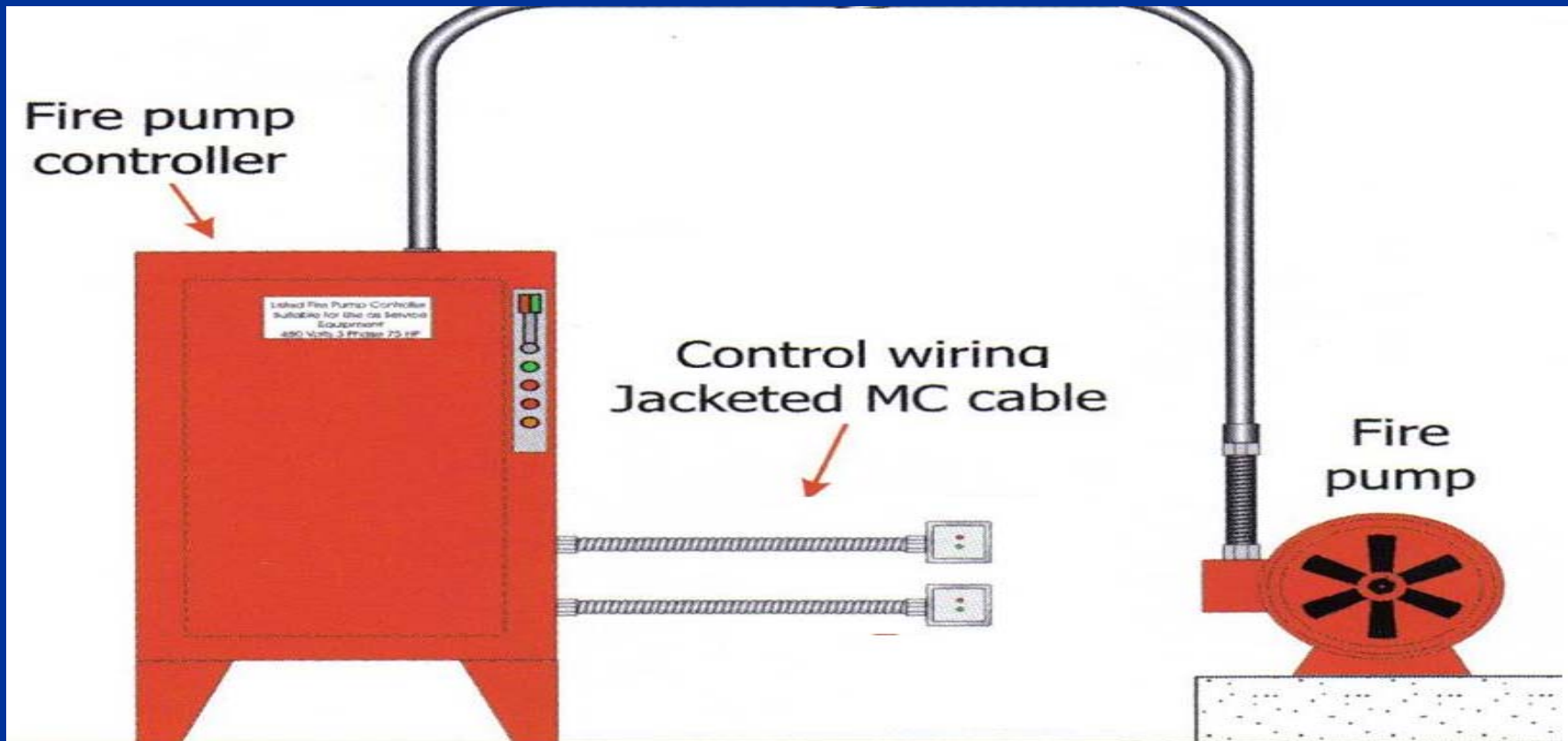
Disconnecting Means: Shall be Sufficiently Remote from other Building or other Fire Pump source disconnecting means.



Article 695.14 (E)

Fire Pumps

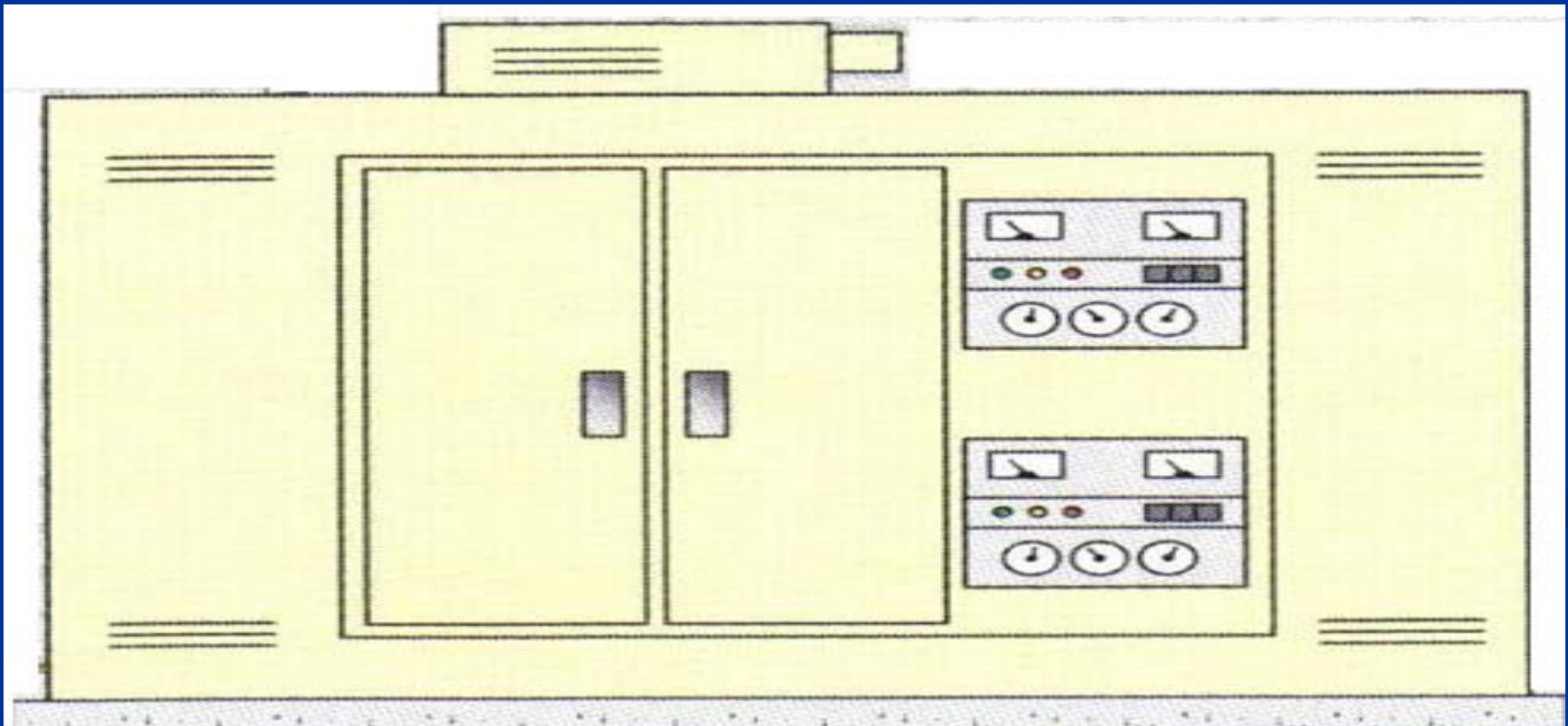
Electric Fire Pumps: Now allows Type MC with an impervious covering for Control wiring.



Article 701.11 (F)

Fuel Cell Systems

Fuel Cell System: Shall have adequate capacity to carry the total load for 2 hours and comply with Parts II – VIII Article 692.



Va. U.S.B.C. Amendments

1. **Assisted Living Facility: U.S.B.C. 2701.1.3**
Emergency power installed as Optional Standby system

Summary

This presentation does not cover all code changes, for additional changes reference 2005 N.E.C. & 2006 I.R.C.

This presentation was developed on changes illustrated in the 2005 N.E.C. code analysis